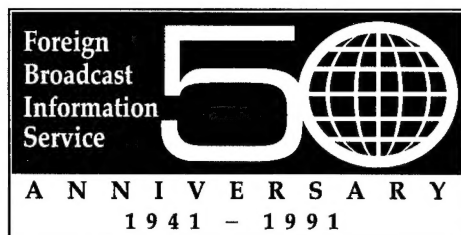


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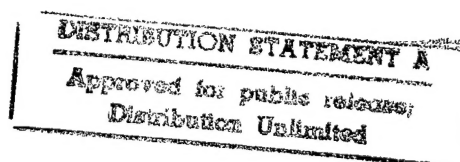


# ***JPRS Report***

# **Science & Technology**

***USSR: Life Sciences***

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# Science & Technology

## USSR: Life Sciences

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### CONTENTS

28 October 1991

#### Agricultural Science

- Transgenic Potato Plants Which Are Resistant to Virus Infection  
*[T. Ts. Glagotskaya, I. S. Shcherbatenko, et al.; DOKLADY AKADEMII NAUK UKRAINSKOY SSR: SERIYA B—GEOLOGICHESKIYE, KHIMICHESKIYE I BIOLOGICHESKIYE NAUKI No 10 Oct 90]* ..... 1

#### Biochemistry

- Expression of Bacillus thuringiensis Delta-Toxin Gene in Transgenic Nicotiana tabacum Plants  
*[I. G. Bodgarina, Ye. B. Rukavtsova, et al.; DOKLADY AKADEMII NAUK SSSR Vol 315 No 6, 28 Dec 90]* ..... 2

#### Biophysics

- Selectivity of Cytolytic Action of Staphylotoxin and Structure of the Water Pores It Forms in Erythrocyte Membranes  
*[R. Z. Sabirov, L. T. Zakhidova, et al.; DOKLADY AKADEMII NAUK SSSR Vol 315 No 6, 28 Dec 90]* ..... 3
- Rhodopsin Photoreceptor in Haematococcus: Effects of Hydroxylamine on Photoelectric Responses and Cellular Phototaxis  
*[O. A. Sineshchekov, Ye. G. Govorunova, et al.; SENSORNIYE SISTEMY Vol 5 No 1, Jan-Mar 91]* ... 3
- Comparative Assessment of Yersinia Pseudotuberculosis Endotoxin Isolated by Successive Extractions  
*[I. M. Yermak, S. I. Moroz, et al.; BIOLOGICHESKIYE MEMBRANY Vol 9 No 2, Feb 91]* ..... 3
- Two Types of Fusicoccin Plasmalemmal Binding Sites on Vicia Faba Protoplasts  
*[A. V. Babakov, Ye. E. Danilina; BIOLOGICHESKIYE MEMBRANY Vol 8 No 2, Feb 91]* ..... 4
- Effects of Cultivation at 37°C and pH 5.0 on Transmembrane Proton Gradient and Cyclic Nucleotides in Yersinia Pestis  
*[S. O. Vodopyanov, L. A. Shevchenko, et al.; BIOLOGICHESKIYE MEMBRANY Vol 8 No 2, Feb 91]* . 4
- Avidin-Induced Lysis of Biotinylated Erythrocytes via Alternative Complement Pathway Depends on Polyvalent Avidin Binding  
*[V. R. Muzykantov, M. D. Smirnov, et al.; BIOLOGICHESKIYE MEMBRANY Vol 8 No 2, Feb 91]* .... 4
- Heterogeneity of Photoreceptor Complex of RC-B890 of Purple Sulfur Bacterium Chromatium Minutissimum  
*[B. G. Vasilyev; BIOLOGICHESKIYE MEMBRANY Vol 8 No 3, Mar 91]* ..... 4
- Effects of Diphenylamine on Composition of Carotenoids in Chromophores and Protein-Pigment Complexes of Chromatium Minutissimum  
*[A. A. Moskalenko, H. Britton, et al.; BIOLOGICHESKIYE MEMBRANY Vol 8 No 3, Mar 91]* ..... 5
- Free Fatty Acid-Dependent Formation of Ion Channels by Protamine in BLM  
*[Ye. A. Korenanova, A. P. Orlov, et al.; BIOLOGICHESKIYE MEMBRANY Vol 8 No 3, Mar 91]* ..... 5
- Comparison of Ion Channels Formed by Staphylococcal A-Toxin and Its N-Terminal 16 kD Fragment  
*[V. I. Ternovskiy, R. K. Zaripova, et al.; BIOLOGICHESKIYE MEMBRANY Vol 8 No 3, Mar 91]* ..... 5
- Nonelectrolyte Impact on Ion Mobility in Bulk Water and Ion Channels: Determination of Pore Radii From Electric Measurements  
*[R. Z. Sabirov, O. V. Krasilnikov, et al.; BIOLOGICHESKIYE MEMBRANY Vol 8 No 3, Mar 91]* ..... 6
- Stability of Hemoglobin-Loaded Liposomes  
*[M. A. Sablina, I. P. Ushakova, et al.; BIOLOGICHESKIYE MEMBRANY Vol 8 No 3, Mar 91]* ..... 6
- High-Frequency Electric Field (HFEF)-Induced Transient Low-Frequency Deformations in Erythrocytes  
*[V. L. Kononenko, M. R. Kasimova; BIOLOGICHESKIYE MEMBRANY Vol 8 No 3, Mar 91]* ..... 6

#### Epidemiology

- Long-Term Prediction and Computer Simulation of Epizootic Plague  
*[M. A. Dubyanskiy, L. D. Dubyanskaya, et al.; ZDRAVOOKHRANENIYE KAZAKHSTANA No 3, Mar 91]* ..... 7

Heterogeneity of Influenza A (H3N2) Viruses 1987-1988 Epidemic [I. L. Kolyvanova, K. Kh. Zhumatov, et al.; ZDRAVOOKHRANENIYE KAZAKHSTANA No 3, Mar 91] .....	7
Early Diagnosis of Leptospirosis [L. P. Blazhnyaya, G. V. Melnik, et al.; SOVETSKAYA MEDITSINA No 2, Feb 91] .....	7

## Genetics

Introduction of Foreign Genes Into Liver, Kidney, and Mammary Gland Cells via High-Speed Mechanical Injection of DNA [A. A. Alimov, V. A. Kolesnikov, et al.; DOKLADY AKADEMII NAUK SSSR Vol 315 No 6, 28 Dec 90] .....	10
Molecular Cloning and Characteristics of Chromosome Copy of Human Gene Copying TNF Receptor [R. L. Turetskaya, D. V. Kuprash, et al.; DOKLADY AKADEMII NAUK SSSR Vol 315 No 6, 28 Dec 90] .....	10
Modulation of Gene Expression of Y. Pestis 65 MD Plasmid by Host Genome [S. A. Lebedeva, L. S. Kuznetsova, et al.; MOLEKULARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA No 4, Apr 91] .....	10
Bacterial Genome Modulation of Expression and Behavior of Ca-Dependence Plague Bacillus Plasmid [L. S. Kuznetsova, S. A. Lebedeva, et al.; MOLEKULARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA No 4, Apr 91] .....	11
Genome Nucleotide and Complete Protein Amino Acid Sequences of Tick-Borne Encephalitis Virus (TBEV) 205 [P. F. Safronov, S. V. Netesov, et al.; MOLEKULARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA No 4, Apr 91] .....	11
Cloning of B-Galactosidase Genes of Industrial Streptococcus Lactis 111 in E. Coli and Conjugative Transmission to Thermobacillus Thermophilus [S. V. Molotov, D. Ye. Duzhiy, et al.; MOLEKULARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA No 4, Apr 91] .....	11

## Immunology

Group- and Type-Specific Antibodies to gag Gene p26 Protein of HIV Immunological Type 2 in Infected Individuals [S. Yu. Klyushnik, L. M. Selimova, et al.; BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY Vol 111 No 3, Mar 91] .....	12
Postvaccination Reaction in Papio Hamadryas to Injection Attenuated Venezuelan Equine Encephalomyelitis Virus Strain 15 [A. G. Filatenko, G. G. Khatayeva, et al.; BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY Vol 111 No 3, Mar 91] .....	12

## Laser Bioeffects

Local Treatment of Burns of Esophagus Through Endoscope by Methods of Laser Therapy and Glue Application [Yu. V. Sinyev, Ye. A. Luzhnikov, et al.; VESTNIK KHIRURGII IMENI I. I. GREKOVA Vol 135 No 11, Nov 90] .....	13
Sociopsychological Aspects of New Management Methods at Health Facilities [M. A. Tatarnikov, V. Yu. Semenov, et al.; ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII No 3, Mar 91] .....	13
Work Standards, Cost Accounting and Salaries of Medical Personnel [V. A. Gavrilov; ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII No 3, Mar 91] .....	13
Action of Low-Intensity, Near-IR Laser Irradiation on Certain Functional-Metabolic Parameters of Isolated Rat Myocardium in Hypoxia [L. D. Lukyanova, I. M. Denisov, et al.; BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY Vol 111 No 3, Mar 91] .....	13
The Effect of He-Ne Laser Radiation on Indices of Myocardial Energy Metabolism [G. K. Chizhov, N. I. Kovalskaya, et al.; BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY Vol 111 No 3, Mar 91] .....	14

## Medicine

- Combined Therapy of Stomach Cancer With Use of Hydroxyradiation  
[V. A. Kosse; *VOPROSY ONKOLOGII* Vol 36 No 11, Nov 90] ..... 15
- Antishock Effect of Opiate Antagonists  
[D. M. Sherman, I. V. Mikulyak; *KLINICHESKAYA KHIRURGIYA* No 12, Dec 90] ..... 15
- Hemosorption in Conventional Treatment of Acute 1,2-Dichloroethane Poisonings  
[O. V. Kurashov, V. A. Trotsevich; *VRACHEBNOYE DELO* No 5, May 91] ..... 15
- Inhalation Therapy for Respiratory Tract Burn Patients  
[S. K. Boyenko; *ZHURNAL USHNYKH, NOSOVYKH I GORLOVYKH BOLEZNEY* No 3, May-Jun 91] ..... 15
- Effect of Varying Doses of Mexamine on Systemic Hemodynamics  
[V. G. Vladimirov, S. M. Smirnova, et al.; *RADIOBIOLOGIYA* Vol 31 No 1, Jan-Feb 91] ..... 18
- Investigation of Anti-Radiation Properties of Betamide Under Conditions of Sublethal and Lethal  $\gamma$ -Radiation Exposure [V. B. Tenchova, T. P. Pantev; *RADIOBIOLOGIYA* Vol 31 No 1, Jan-Feb 91] ..... 18
- Effects of Type 1 Interferon (IF-1) on Endotoxic Shock  
[Yu. N. Anisimova, I. V. Filchakov, et al.; *PATOLOGICHESKAYA FIZIOLOGIYA I EKSPERIMENTALNAYA TERAPIYA* No 1, Jan-Feb 91] ..... 18
- Laser Correlation Spectroscopy of Blood Serum in Assessing the Effectiveness of Hemosorption in Myasthenia  
[V. S. Lobzin, I. I. Nisevich, et al.; *BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY* Vol 111 No 3, Mar 91] ..... 19

## Microbiology

- Detection of Plasmids of Methane-Oxidizing Bacteria  
[V. A. Romanovskaya, S. M. Stolyar, et al.; *MIKROBIOLOGICHESKIY ZHURNAL* Vol 53 No 1, Jan-Feb 91] ..... 20
- Study of Antistaphylococcal Activity of Thionium in Experiments In Vitro  
[G. T. Pisko, A. P. Dombrovskiy; *MIKROBIOLOGICHESKIY ZHURNAL* Vol 53 No 1, Jan-Feb 91] .... 20
- Physiological Activity of Methanotrophic Bacteria During Their Interaction With Rocks  
[I. K. Kurdish, N. F. Kigel, et al.; *MIKROBIOLOGICHESKIY ZHURNAL* Vol 53 No 1, Jan-Feb 91] ... 20

## Molecular Biology

- Use of E. Coli Inorganic Pyrophosphatase in ELISA for Plant Viruses  
[O. A. Mizenina, O. V. Borisova, et al. ; *BIOLOGICHESKIYE NAUKI* No 2, Feb 91] ..... 21
- Strain-Dependent Responsiveness of Spring Wheat to Plant Growth Regulators  
[V. I. Sutulova, I. V. Yegorov, et al. ; *BIOLOGICHESKIYE NAUKI* No 2, Feb 91] ..... 21

## Pharmacology, Toxicology

- Pharmacodynamics of Hepatoprotectors From *Silybium marianum* (Blessed Milk Thistle)  
[Zh. N. Rumyantseva; *VRACHEBNOYE DELO* No 5, May 91] ..... 22

## Physiology

- Changes of Microcirculation During Experimental Trigeminal Neuralgia in Rats  
[G. N. Kryzhanovskiy, M. P. Gorizontova, et al.; *BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY* Vol 111 No 1, Jan 91] ..... 23
- Elimination of Disturbances of Electrical Stability of Heart and Arrhythmias With Aid of Synthetic Analog of Acetylcholine  
[F. Z. Meerson, I. Ya. Kalvinsh, et al.; *BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY* Vol 111 No 1, Jan 91] ..... 23
- Surface Activity of Substance P and Its Interaction With Lipid Monolayers  
[V. K. Rybalchenko, B. R. Mogilevich; *DOKLADY AKADEMII NAUK UKRAINSKOY SSR: SERIYA B—GEOLOGICHESKIYE, KHIMICHESKIYE I BIOLOGICHESKIYE NAUKI* No 10, Oct 90] ..... 23
- Beta-Endorphin Level in Chronic Active Hepatitis Patients  
[V. N. Khvorostinka, L. M. Pasiyeshvili, et al.; *VRACHEBNOYE DELO* No 5, May 91] ..... 24
- Human Adaptation to Moderate Altitude Hypoxia and Hyperthermia During Physical Effort  
[Ye. A. Kushnirenko, E. Sokolowski, et al. ; *FIZIOLOGIYA CHELOVEKA* Vol 17 No 2, Mar-Apr 91] .. 24



Dedication of New Brain Research Center in Leningrad [V. M. Vladimirskaia; FIZIOLOGIYA CHELOVEKA Vol 17 No 2, Mar-Apr 91]	24
Enhancement of Animal Endurance by Para-Aminobenzoic Acid (PABA) [N. I. Arlashchenko, D. Ya. Oparina, et al.; IZVESTIYA AKADEMII NAUK SSSR: SERIYA BIOLOGOGICHESKAYA No 2, Mar-Apr 91]	24
In Vitro Fibrinolytic and In Vivo Anticoagulant Actions of Tuftsin [I. P. Ashmarin, V. Ye. Pastorova, et al.; IZVESTIYA AKADEMII NAUK SSSR: SERIYA BIOLOGOGICHESKAYA No 2, Mar-Apr 91]	25
Effects of Cucumarioside on Liver Regeneration [S. N. Turishchev, G. B. Bolshakova, et al.; IZVESTIYA AKADEMII NAUK SSSR: SERIYA BIOLOGOGICHESKAYA No 2, Mar-Apr 91]	25
Role of Opiate Mechanisms of the Hippocampus and Substantia Nigra in Behavioral and Convulsive Disorders in Picrotoxin Kindling [G. N. Kryzhanovskiy, A. A. Shandra, et al.; BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY Vol 111 No 3, Mar 91]	25
Effect of Taurin on the Density of Adrenergic Nerve Endings and Restoration of Heart Functions After Ischemia [T. M. Pukhova, N. I. Zhukova; BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY Vol 111 No 3, Mar 91]	26
The Effect of Arginine-Vasopressin on Excitability and Fatty Acid Content of Rat Brain Structures in Neurosis [P. A. Nerush; BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY Vol 111 No 3, Mar 91]	26
Action of Befol and Its Derivatives on Monoaminooxidase of Varying Origin [O. A. Goldina, T. A. Moskvitina, et al.; BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY Vol 111 No 3, Mar 91]	26
The Effect of Nerve Growth Factor on Cholinergic Neurons in Dissociated Cultures of Septum Pellucidum [N. K. Isayev, I. V. Viktorov; BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY Vol 111 No 3, Mar 91]	27
Antiarrhythmic Sequelae of Adaptation to Hypoxia: Electrical Correlates [F. Z. Meyerson, V. I. Vovk; FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOVA Vol 76 No 10, Oct 90]	27
Antioxidant Modulation of Thyroxine Effects on Rat Myocardium [T. S. Balashova, N. K. Khitrov, et al.; FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOVA Vol 76 No 10, Oct 90]	27
Modulation of Gastrointestinal Slow Waves and Migrating Electric Complex [I. I. Busygina, N. I. Korteza, et al.; FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOVA Vol 76 No 10, Oct 90]	28
S-100 Protein: Correlation With Memory [L. A. Gromov, L. P. Syrovatskaya, et al.; ZHURNAL VYSSHEY NERVNOY DEYATELNOSTI IMENI I. P. PAVLOVA Vol 41 No 1, Jan-Feb 91]	28
Effects of Penta Peptide on Conditioned Reflexes in Young Rats [L. A. Tsitolovskaya, N. A. Ryabchikova, et al.; ZHURNAL VYSSHEY NERVNOY DEYATELNOSTI IMENI I. P. PAVLOVA Vol 41 No 1, Jan-Feb 91]	28
Synaptic Transmission and Excitability of Command Neurons Involved in Defensive Behavior of Helix Lucorum: Modulation by Small Cardioactive Peptide (b) (SCPb) [N. I. Bravarenko; ZHURNAL VYSSHEY NERVNOY DEYATELNOSTI IMENI I. P. PAVLOVA Vol 41 No 1, Jan-Feb 91]	29
Enhancement of Stress Tolerance by D-Phenylalanine [Ye. A. Yumatov, Ye. I. Sarychev, et al.; ZHURNAL VYSSHEY NERVNOY DEYATELNOSTI IMENI I. P. PAVLOVA Vol 41 No 1, Jan-Feb 91]	29
Phosphorylation of Synaptic Membrane Proteins in Carbachol-Induced Mnemic Dissociation [V. I. Arkhipov, T. G. Shchipakina; ZHURNAL VYSSHEY NERVNOY DEYATELNOSTI IMENI I. P. PAVLOVA Vol 41 No 1, Jan-Feb 91]	29

## Public Health

New Payment System Seen as Threat to Rural Hospitals [T. Odinkova; PRAVDA UKRAINY 13 Mar 91]	31
---	----

Blood Donations Down, Commercialization Considered [Unattributed Author; <i>VECHERNIY TALLINN</i> 9 Feb 91]	32
Health of One-Year-Old Children and Health Monitoring in Rural Areas [A. K. Mashkeyev, Sh. I. Khusainova, et al.; <i>ZDRAVOOKHRANENIYE KAZAKHSTANA</i> No 3, Mar 91]	32
Incidence of Hypertension Among Students [T. Z. Seysembekov, N. S. Umbetalina, et al.; <i>ZDRAVOOKHRANENIYE KAZAKHSTANA</i> No 3, Mar 91]	33
Advances in Treatment of Alcoholism and Drug Abuse [A. Izmalkov; <i>ZDRAVOOKHRANENIYE KAZAKHSTANA</i> No 3, Mar 91]	33
Prophylactic Efficacy of Bemityl on Long Sea Trips [V. S. Novikov, V. N. Bortnovskiy, et al.; <i>GIGIYENA I SANITARIYA</i> No 3, Mar 91]	33
Validation and Implementation of Comprehensive Mother and Child Health Services in Tver Oblast [A. F. Vinogradov, V. L. Krasnenkov, et al.; <i>ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII</i> No 1, Jan 91]	33
Assessment of Efficacy of 'Zdorov'ye' Comprehensive Health Program by Novosibirsk Oblast Leadership [Ye. K. Ladygina, A. I. Babenko; <i>ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII</i> No 1, Jan 91]	34
Reorganization of RSFSR Emergency Service [L. Yu. Pavlova; <i>ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII</i> No 1, Jan 91]	34
RSFSR Reviews Drug, Alcohol Treatment Work [I. A. Nikiforov, A. V. Shevchenko; <i>ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII</i> No 1, Jan 91]	35
Reader Response to TRUD Article on Drug Shortage [Unattributed Author; <i>TRUD</i> , 17 Jul 91]	37
Correspondent Surveys Local Pharmacies [V. Kirsanova; <i>TRUD</i> , 17 Jul 91]	38
TRUD Editors' Open Letter on Drug Shortages [Unattributed Author; <i>TRUD</i> , 17 Jul 91]	39
Soviet Union Lacks Domestically Produced Diagnostic Systems for Endocrinopathies [Ye. Marova, M. Balabolkin, et al.; <i>PRAVDA</i> , 2 Jul 91]	39
End of Poultice Production Monopoly Increases Supply [V. Zlobin; <i>SOVETSKAYA ROSSIYA</i> , 6 Sep 91]	41
Public Warned of Possible Contamination of Medicinal Plants [T. Pleteneva Interview; <i>SOVETSKAYA ROSSIYA</i> , 5 Jul 91]	43
Soviet-British Homeopathic Institute Created in Moscow [T. Shvedovskaya; <i>SOVETSKAYA ROSSIYA</i> , 5 Jul 91]	44
US Pharmaceutical Aid to Aral Region Reported [I. Barsukov; <i>SELSKAYA ZHIZN</i> , 8 Jun 91]	44
Latvian Pharmaceuticals Prices Set by Market [T. Klimovich Interview; <i>SOVETSKAYA LATVIYA</i> , 9 Jul 91]	45
RSFSR Health Minister Kalinin on Republic's Medical Supplies Problems [V. Kalinin, V. Deygin Interview; <i>IZVESTIYA</i> , 5 Jul 91]	46
Deputy Premier Rakhimova on Shortages of Medical Supplies [B. F. Rakhimova Interview; <i>TRUD</i> , 31 Jul 91]	48
Prosecutor Describes Misappropriations of Imported Medicines [A. Churilov Interview; <i>EKONOMIKA I ZHIZH</i> No 10, Mar 91]	49
Medical Industry Minister on Pharmaceuticals Shortages [V. A. Bykov Interview; <i>PRAVITELSTVENNY VESTNIK</i> No 7, Feb 91]	51

## Radiation Biology

Investigation of Parameters of Physical Fitness of Rodents by Means of Multiple Speed Swimming Following Uniform and Uneven Exposure to High Radiation Doses [V. N. Malakhovskiy, P. P. Mikhaylichenko, et al.; <i>RADIOBIOLOGIYA</i> Vol 31 No 1, Jan-Feb 91]	54
Thyroid Hormone Involvement in Modification of Mutagenic Effect of Microwaves [I. V. Koveshnikova, Ye. N. Antipenko; <i>RADIOBIOLOGIYA</i> Vol 31 No 1, Jan-Feb 91]	54
Novel Radiation Technique of in Vivo Determination of Stable Iodine Level in Thyroid [I. O. Tomashevskiy, D. I. Tomashevskiy, et al.; <i>MEDITSINSKAYA RADIOLOGIYA</i> Vol 36 No 3, Mar 91]	54
Treatment of Victims of Accident at Chernobyl and Indirect Outcomes of Disease [A. Ye. Baranov, A. K. Guskova, et al.; <i>MEDITSINSKAYA RADIOLOGIYA</i> Vol 36 No 3, Mar 91]	54
Ultrasound Scanning of Thyroid in Children From Bryansk Oblast in 1989 [G. A. Zubovskiy, O. B. Tararukhina; <i>MEDITSINSKAYA RADIOLOGIYA</i> Vol 36 No 3, Mar 91]	55

Radiation Exposure of Personnel at Industrial and Atomic Energy Reactors [L. A. Buldakov, A. M. Vorobyev, et al.; <i>MEDITSINSKAYA RADIOLOGIYA</i> Vol 36 No 3, Mar 91]	55
--	----

## Virology

Inhibition of pH-Dependent Fusion of Equine Encephalitis Virus With Artificial Membranes Using Non-Neutralizing Monoclonal Antibodies [M. F. Vorovich, A. V. Timofeyev, et al.; <i>DOKLADY AKADEMII NAUK SSSR</i> Vol 316 No 1, Jan-Feb 91]	56
Antigenic Properties of Nucleocapsule Protein Peptide Fragments in Delta Hepatitis Virus [R. P. Yevstigneyeva, V. D. Smirnov, et al.; <i>DOKLADY AKADEMII NAUK SSSR</i> Vol 316 No 1, Jan-Feb 91]	56
Solubilizing Properties of Protein Conjugates With Water-Soluble Polyesters [I. N. Topchiyeva, I. G. Momot, et al.; <i>DOKLADY AKADEMII NAUK SSSR</i> Vol 316 No 1, Jan-Feb 91]	56
Effects of Laser Light Intensity on Gastric Ulcer Healing [A. S. Loginov, G. N. Sokolova, et al.; <i>SOVETSKAYA MEDITSINA</i> No 2, Feb 91]	56
Laser Therapy in Chronic Obstructive Pulmonary Diseases (COPD) [Ye. V. Demicheva; <i>SOVETSKAYA MEDITSINA</i> No 2, Feb 91]	57
Mental Status of HIV Infected Individuals During Social and Psychological Adjustment [V. V. Belyayeva, Ye. V. Ruchkina; <i>SOVETSKAYA MEDITSINA</i> No 2, Feb 91]	57
HIV Antigens Produced by Recombinant Vaccinia Virus: Properties and Use in Confirmatory Tests [M. I. Bukrinskiy, A. N. Vzorov, et al.; <i>ACTA VIROLOGICA</i> Vol 34 No 5, Sep 90]	57

## Miscellaneous

5'-Variable Genome Sequence of Vaccinia Virus L1VP. Possible Role of Short Direct Repeats in Formation of DNA Deletions [G. G. Prikhodko, I. V. Babkin; <i>GENETIKA</i> Vol 27 No 1, Jan 91]	58
NMR T <sub>1</sub> Relaxation Time of Plasma in Burn Cases [G. I. Kozinets, O. V. Popova, et al.; <i>LABORATORNOYE DELO</i> No 3, Mar 91]	58
Antioxidant Index of Biological Materials [V. B. Martynyuk, S. N. Kovalchuk, et al.; <i>LABORATORNOYE DELO</i> No 3, Mar 91]	58
Differential Medium for Yersinia Isolation [V. I. Kuznetsov; <i>LABORATORNOYE DELO</i> No 3, Mar 91]	58

**Transgenic Potato Plants Which Are Resistant to Virus Infection**

917C0487A Kiev DOKLADY AKADEMII NAUK  
UKRAINSKOY SSR: SERIYA B—GEOLOGICHESKIYE,  
KHIMICHESKIYE I BIOLOGICHESKIYE NAUKI  
in Russian No 10, Oct 90 pp 57-59

[Article by T. Ts. Glagotskaya, I. S. Shcherbatenko, B. A. Sidorov et al.; Department of Cellular Biology and Engineering; UkSSR Academy of Sciences; Kiev; Institute of Microbiology and Virology; UkSSR Academy of Sciences; Kiev; Institute of Molecular Biology; USSR Academy of Sciences; Moscow]

UDC 575:577.21:578.85/.36

[Abstract] Production of transgenic lines of commercial varieties of potatoes (Temp, Zarevo, Lvovyanka) and comparative study of their reaction to potato virus X as a function of the orientation of the integrated protein gene of the virus membrane confirmed the data in the literature concerning suppression of virus X infection in transgenic potato plants with a high level of expression of protein membrane genes in a sense orientation. A similar protective effect under antisense orientation of the viral gene in the potato genome was reported for the first time. With concentration of potato virus X exceeding 0.05 µg/ml, the vulnerability of the transgenic plants did not differ from that of control plants. The transgenic plants produced may serve as a model object for virological studies and should prove to be of interest to persons engaged in practical selection. Figures 3; references 6: 4 Russian, 2 Western.

**Expression of *Bacillus thuringiensis* Delta-Toxin Gene in Transgenic *Nicotiana tabacum* Plants**

917C0495D Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 315 No 6, (manuscript received 20 Oct 90) pp 1489-1492

[Article by I. G. Bodgarina, Ye. B. Rukavtsova, V. V. Shmatchenko, V. Ye. Zinkevich, I. S. Sever, Ye. M. Aslanyan, F. Sh. Isangalin, Ya. I. Buryanov, and Academician A. A. Bayev, Institute of Biochemistry and Physiology of Microorganisms, USSR Academy of Sciences, Pushchino, Moscow Oblast; All-Union Scientific Research Institute of Applied Microbiology, Obolensk, Moscow Oblast]

UDC 577.1

[Abstract] In an effort to find ways to use toxins of *Bac. thuringiensis* for plant protection, the researchers created transgenic *Nicotiana tabacum* var. Samsum that are resistant to insect larvae. The pBT18 plasmid, which contains the entire gene bt of the  $\delta$ -endotoxin *Bac. thuringiensis* var. berliner 1715, served as the DNA

donor. The vector chosen—pAP 2034—contains a unique BamHI site that is located under the promoter 1' TR-DNA of the octopine Ti plasmid and a polyadenylation site of gene 7 of the Ti plasmid pTiA6. Through the cloning, the plasmid pBTP38 was screened. It is a 12-kbp plasmid and contains the entire gene bt under the 1' promoter and a marker gene for neomycinphosphotransferase II under the 2' promoter. Plasmid pBTP39, with a shortened bt gene was produced via deletion from the 3' end of the fragment KpnI in pBTP38. Those plasmids were transferred from *E. coli* cells to agrobacteria in two stages. Agrobacteria containing the cointegrates pGV3850::pBTP38 and pGV3850::pBTP39 were used to produce transgenic plants by means of tobacco leaf disk transformation. The transformed cells screened out with a high-kanamycin-content MS medium, and individual plants were regenerated from cells resistant to kanamycin. The transfer and expression of the bt gene in the plants was verified with radioimmunoassay that used  $^{125}\text{I}$ -labelled protein A. Figures 4; references 12: 3 Russian, 9 Western.

**Selectivity of Cytolytic Action of Staphylotoxin and Structure of the Water Pores It Forms in Erythrocyte Membranes**

917C0495C Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 315 No 6, (manuscript received 12 Mar 90) pp 1479-1481

[Article by R. Z. Sabirov, L. T. Zakhidova, O. V. Krasilnikov, and UzSSR Academy of Sciences Academician B. A. Tashmukhamedov, Institute of Physiology, USSR Academy of Sciences, Tashkent]

UDC 577.352.4

[Abstract] In addressing the question of whether the pores formed by the *Staphylococcus aureus*  $\alpha$ -toxin in the membranes of sensitive rabbit cells and resistant human cells are identical, the researchers here assessed effective pore radius in erythrocyte membranes of both species. The base medium used consisted of 150 mM NaCl, 5 mM tris-HCl, pH 7.5. Level of hemolysis was determined from absorption ( $\lambda = 540$  nm) of a supernatant produced after a 2 percent suspension of cells preincubated with various *S. aureus* concentrations was centrifuged. The radius corresponding to 100 percent hemolysis was determined after osmotic lysis of the aliquot of cells in distilled water. The researchers found that in the human *S. aureus*-resistant membranes, in the region of lytic concentrations (10-400  $\mu$ g/ml), the toxin forms water pores with an effective radius of 13-14 angstroms. The effective radii of the pores in the rabbit membranes proved to be considerably more dependent on toxin concentration. For example, starting at concentrations that were 100 times greater than that sufficient for 100 percent hemolysis, the effective radius was virtually unchanged, at  $10.5 \pm 1$  angstrom. The researchers concluded that *S. aureus* forms water pores of at least two different structures. One is formed on human erythrocytes (radius: 13-14 angstroms) and is a hexamer of *S. aureus* molecules. No receptors need be on the membrane. The other structure (on rabbit membranes when the *S. aureus* concentration is 100 nM or less) has a smaller radius and is not found in bilayer membranes. Physically, it can be formed by a smaller number of toxin molecules—presumably five. The pentamer structure is preferable in the presence of a specific receptor and at low toxin concentrations. Figures 1; references 4; Western.

**Rhodopsin Photoreceptor in Haematococcus: Effects of Hydroxylamine on Photoelectric Responses and Cellular Phototaxis**

917C0514A Moscow SENSORNYE SISTEMY in Russian Vol 5 No 1, Jan-Mar 91 (manuscript received 25 Sep 90) pp 51-55

[Article by O. A. Sineshchikov, Ye. G. Govorunova and F. F. Litvin, Moscow State University imeni M. V. Lomonosov]

UDC 577.354.23

[Abstract] Incubation studies with *Haematococcus pluvialis* and *H. lacustris* showed that 1-2 mM hydroxylamine (HA) inhibited both phototaxis and photoaccumulation due to diminished photoorientation, indicating thereby the rhodopsin nature of the photoreceptor in these algae. The inhibitory effects were observed with one- to five-day-old cultures during illumination with 380 and 500 nm light and were not affected by diuron, an inhibitor of photosynthesis. Microelectrode measurement from single cells demonstrated that preincubation with HA for 1 h depresses stationary photoreceptor electric potentials about 3-fold under  $2 \times 10^3$  lux illumination. The effects in the dark were essentially negligible ( $< 10$  percent). Since depression of the electric potential preceded tactic changes, the mechanism of action of HA evidently involves direct effects on the hypothetical retinal-based photoreceptor. Figures 3; references 13: 2 Russian, 11 Western.

**Comparative Assessment of Yersinia Pseudotuberculosis Endotoxin Isolated by Successive Extractions**

917C0549A Moscow BIOLOGICHESKIYE MEMBRANY in Russian Vol 8 No 2, Feb 91 (manuscript received 8 May 90) pp 128-133

[Article by I. M. Yermak, S. I. Moroz, T. F. Solovyeva and Yu. S. Ovodov, Pacific Institute of Bioorganic Chemistry, Far Eastern Scientific Center, USSR Academy of Sciences, Vladivostok]

UDC 579.842.23:577(114+115)

[Abstract] Comparative analysis was conducted on endotoxin preparations obtained from *Y. pseudotuberculosis* using successive extractions. In one series of experiments acetone dried microbial mass was extracted with 5 percent TCA using the Boivin procedure, followed by combinations of centrifugations and further extractions with 0.1 M  $\text{NaHCO}_3$ , pH 10.7, and 0.1 M  $\text{NaHCO}_3$ , pH 10.7, + 1 mM EDTA to provide LPS-protein complexes. In another series LPS was derived from the LPS-protein complexes or the microbial mass by treatment with 45 percent phenol (Westphal method). The results demonstrated that extractions involving EDTA and purification on Sepharose 2B increased the yield of endotoxin 4-fold over that obtained with TCA alone, with retention of identical composition (monosaccharide:protein = 2:1; 14.5 and 40 kD polypeptides) and buoyant density (1.40 g/cm<sup>3</sup>). However, the LPS fractions contained  $< 1$  percent of the protein component and were characterized by shorter O-specific carbohydrate chains. Figures 3; tables 1; references 24: 2 Russian, 22 Western.



### Two Types of Fusicoccin Plasmalemmal Binding Sites on Vicia Faba Protoplasts

917C0549B Moscow BIOLOGICHESKIYE  
MEMBRANY in Russian Vol 8 No 2, Feb 91  
(manuscript received 4 Apr 90) pp 134-139

[Article by A. V. Babakov and Ye. E. Danilina, All-Union Scientific Research Institute of Agricultural Biotechnology, All-Union Agricultural Academy, Moscow]

UDC 58.085:577.352.3

[Abstract] Protoplasts prepared from mesophilic and stomal guard cells of *Vicia faba* were used to assess plasmalemmal binding sites for fusicoccin, a plant growth regulator isolated from the fungus *Fusicoccum amigdalii*. Binding studies with [<sup>3</sup>H]dihydrofusicoccin led to identification of two types of bindings sites with  $K_d$  values of  $2 \times 10^{-9}$  M (type 1) and  $2 \times 10^{-7}$  M (type 2). Saturation of the binding sites was obtained after ca. 60 min of incubation: 50 percent binding with type 1 and 2 binding sites of guard cell protoplasts required 8 and 11 min, respectively, and 6 and 12 min in the case of the corresponding sites of mesophilic protoplasts. The binding kinetics of type 2 sites correlated with the physiologically-active concentrations of fusicoccin in terms of hydrogen ion efflux. Binding activity was not affected by osmotic shock or EDTA, while  $\text{NaN}_3$  and CICCIP reduced binding by ca. 50 percent by both types of sites. Chymotrypsin reduced binding by type 2 sites by 85 percent, without affecting type 1 sites. Additional studies with type 2 sites showed that gibberellins, auxin, benzylaminopurine and abscisic acid failed to bind. Figures 2; tables 2; references 12: 3 Russian, 9 Russian.

### Effects of Cultivation at 37°C and pH 5.0 on Transmembrane Proton Gradient and Cyclic Nucleotides in *Yersinia Pestis*

917C0549C Moscow BIOLOGICHESKIYE  
MEMBRANY in Russian Vol 8 No 2, Feb 91  
(manuscript received 7 May 90) pp 140-145

[Article by S. O. Vodopyanov, L. A. Shevchenko and B. N. Mishankin, Scientific Research Antiplague Institute, USSR Ministry of Health, Rostov-on-Don]

UDC 579.842.23+577.112/121

[Abstract] Cultivation of *Yersinia pestis* EB76 at 37°C in L broth with 0.1 M MES-tris buffer, pH 5.0, was shown to lower the intracellular pH to 5.8-6.0 from baseline pH 7.8 during the 90 min period of observation. Studies with small permeable organic acids and protonophores showed that the lowest pH compatible with viability was 5.8. Intracellular reduction in pH was accomplished by a rise in cAMP and cGMP, indicating that intracellular pH may have an impact on gene expression via the cascade mediated by the cyclic nucleotides. Figures 3; tables 2; references 24: 12 Russian, 12 Western.

### Avidin-Induced Lysis of Biotinylated Erythrocytes via Alternative Complement Pathway Depends on Polyvalent Avidin Binding

917C0549D Moscow BIOLOGICHESKIYE  
MEMBRANY in Russian Vol 8 No 2, Feb 91  
(manuscript received 25 Jul 90) pp 146-155

[Article by V. R. Muzykantov, M. D. Smirnov and G. P. Samokhin, Institute of Experimental Cardiology, All-Union Cardiological Scientific Center, USSR Academy of Medical Sciences, Moscow]

UDC 612.111.547.96

[Abstract] An analysis was conducted on the factors leading to complement-mediated lysis of sheep erythrocytes coated with biotin and exposed to avidin. The results showed that the degree of lysis based on the alternative complement pathway (ACP) was dependent on the extent of avidin binding to biotin and decreased in proportion to the decrease in the surface density of biotin molecules on the red cells. However, lysis mediated via the classical complement pathway (CCP), using rabbit antisera against avidin, was not affected by the surface density of biotin molecules. Preincubation of avidin with biotin diminished subsequent ACP-dependent lysis of biotin-coated cells but had no effect on CCP-mediated lysis. The data were interpreted to indicate that extensive polyvalent binding between avidin and red cell-coupled biotin is required for erythrocyte lysis via ACP, and any factor that precludes such interaction on the surface of the red cell attenuates lysis. Such polyvalent interactions may possibly be involved in the recently reported fact that HIV infected lymphoid cells are lysed by homologous complement via ACP mechanisms. Figures 8; references 22: 2 Russian, 20 Western.

### Heterogeneity of Photoreceptor Complex of RC-B890 of Purple Sulfur Bacterium *Chromatium Minutissimum*

917C0550A Moscow BIOLOGICHESKIYE  
MEMBRANY in Russian Vol 8 No 3, Mar 91  
(manuscript received 14 Feb 90) pp 240-248

[Article by B. G. Vasilyev, Institute of Pedology and Photosynthesis, USSR Academy of Sciences, Pushchino, Moscow Oblast]

UDC 581.174:581.1

[Abstract] Treatment of photosynthetic membranes of *Chromatium minutissimum* with Triton X-100 and polyacrylamide gel electrophoresis led to identification of two photoreceptor complexes (RC-B890I and RC-B890II) in the reaction center RC-B890. Both photoreceptors displayed essentially identical absorption spectra, differential spectra at long-wavelength, and photochemical activities ( $\Delta A_{890}/A_{890}$ ). However, RC-B890I had slower electrophoretic mobility (attributed to greater



molecular mass), a pI of 5.0 (vs. 4.0 RC-B890II), showed greater susceptibility to degradation by pronase, contained essentially low-potential cytochromes (30 kD), a small number of 50 kD cytochromes, and lacked 60 kD cytochromes evident in RC-B890II. RC-B890I is absent in purified chromatophores, but is present in crude chromatophore and vesicular fractions. The latter indicates that RC-B890I occurs in different membranes than RC-B890II. Figures 7; tables 1; references 21: 8 Russian, 13 Western.

**Effects of Diphenylamine on Composition of Carotenoids in Chromophores and Protein-Pigment Complexes of Chromatium Minutissimum**

917C0550B Moscow BIOLOGICHESKIYE  
MEMBRANY in Russian Vol 8 No 3, Mar 91  
(manuscript received 7 Jun 90) pp 249-260

[Article by A. A. Moskalenko, H. Britton\*, A. Connor\*, A. Young\* and O. A. Toropygina, Institute of Pedology and Photosynthesis, USSR Academy of Sciences, Pushchino, Moscow Oblast; \* Liverpool University, Great Britain]

UDC 581.174.1

[Abstract] An analysis was conducted on the effects of different cellular levels of carotenoids on the light-harvesting complex (LHC) B800-850 and reaction center (RC) B890. Variation in carotenoid levels was achieved by cultivation of *Chr. minutissimum* on Larsen mineral medium with and without 12 mg/L of diphenylamine (DPA). DPA was shown to inhibit conversion of carotenoid precursors phytoene and phytofluene to the end carotenoid spirilloxanthin. Hydrospirene was the major intermediate detected until spirilloxanthin was synthesized, following which rhodopene became the major intermediate. Spectral studies on LHC B800-850 and RC-B890 showed that the differences were attributable to accumulation of longer chromophores in the latter. Evidently, carotenoid-binding sites in RC-B890 showed higher affinity for longer chromophores than shorter chromophores. Stability of LHC B800-850 to Triton X-100 has been shown to be dependent on inclusion of at least one carotenoid molecule per complex, versus the 12 molecules in mature LHCs. Figures 3; tables 1; references 37: 8 Russian, 29 Western.

**Free Fatty Acid-Dependent Formation of Ion Channels by Protamine in BLM**

917C0550C Moscow BIOLOGICHESKIYE  
MEMBRANY in Russian Vol 8 No 3, Mar 91  
(manuscript received 6 Jun 90) pp 266-270

[Article by Ye. A. Korenanova, A. P. Orlov and Yu. A. Vladimirov, Chair of Biophysics, 2nd Moscow State Medical Institute imeni N. I. Pirogov, Moscow]

UDC 557.352.465

[Abstract] An analysis was conducted on the mechanism of protamine interaction with cell membranes using an azolectin:lauric acid (3:1) bilayer lipid membrane (BLM) model. Exposure of the BLMs to protamine under appropriate conditions (0.1 M KCl, pH 7.4, membrane potential 50-100 mV) induced fluctuations in membrane conductivity, indicating formation of ion channels with a minimum conductivity of ca. 3.6 pS. The electrostatic interaction of protamine with lauric acid was confirmed by pH-dependence of the phenomenon. Shifting the pH into the alkaline region from the pK of the acid was shown to increase the channel-forming efficiency of protamine, whereas a shift into more acidic region abolished channel formation. Consequently, interaction of protamine with fatty acids in biological membranes may underlie membrane damage by protamine, a mechanism of action that may also be responsible for the efficacy of peptide antibiotics (eg., polymyxins). Figures 3; references 15: 9 Russian, 6 Western.

**Comparison of Ion Channels Formed by Staphylococcal A-Toxin and Its N-Terminal 16 kD Fragment**

917C0550D Moscow BIOLOGICHESKIYE  
MEMBRANY in Russian Vol 8 No 3, Mar 91  
(manuscript received 3 Apr 90) pp 271-279

[Article by V. I. Ternovskiy, R. K. Zaripova, O. V. Krasilnikov and A. S. Korneyev, Institute of Physiology, Uzbek SSR Academy of Sciences, Tashkent]

UDC 579.222'112:591.145.2

[Abstract] A comparative study was conducted on the ion channel-forming efficiency of staphylococcal  $\alpha$ -toxin and its 16 kD N-terminal fragment prepared by tryptic digestion. Preliminary determinations of biological activities showed that the LD<sub>50</sub> values of the 16 kD fragment was some 3-fold higher than that of intact toxin on intravenous injection to outbred albino mice, and the hemolytic activity only 0.01% of that exhibited by the toxin against rabbit erythrocytes. Electric studies on phosphatidylcholine:lecithin (4:1 by wt.) bilayer lipid membranes (BLM) showed that the 16 kD fragment retained only 10 percent of efficiency of the toxin in enhancing BLM conductivity. Although the toxin and the fragment both formed channels with 12 Å radii, the  $\alpha$ -toxin-induced channels were anion selective and the 16kD fragment channels were cation selective. Volt-ampere characteristics of the 16 kD fragment- and  $\alpha$ -toxin-formed channels had coefficients of asymmetry of ca. 5 and ca. 2, respectively, at pH 7.5. The data were consistent with the interpretation that the 16 kD fragment functions as the channel-forming moiety of the  $\alpha$ -toxin, while cell-binding sites are located on the remaining portion of the molecule. Figures 13; references 19: 4 Russian, 15 Western.

### Nonelectrolyte Impact on Ion Mobility in Bulk Water and Ion Channels: Determination of Pore Radii From Electric Measurements

917C0550E Moscow BIOLOGICHESKIYE  
MEMBRANY in Russian Vol 8 No 3, Mar 91  
(manuscript received 23 May 90) pp 280-291

[Article by R. Z. Sabirov, O. V. Krasilnikov, V. I. Ternovskiy and P. G. Merzlyak, Institute of Physiology, Uzbek SSR Academy of Sciences, Tashkent]

UDC 577.352(26+465)

[Abstract] KCl solutions were employed in comparative analysis of the impact of hydrophilic nonelectrolytes on conductivity in bulk water and ion channels in phosphatidylserine bilayer lipid membranes (BLM), in order to determine putative mechanisms of ion transport in such channels. Conductivity was shown to be a function of nonelectrolyte concentration (glucose, sucrose, glycerol, ethylene glycol, 300-20,000 D polyethylene glycol (PEG)) and independent of their MW, hydrodynamic radii, and viscosity. Changes in conductivity induced by low-MW PEG, behaving as KCl-saturated globules, were essentially identical for the bulk solvent and in anionic channels induced by staphylococcal  $\alpha$ -toxin and cationic channels induced by latrotoxin. The latter observations indicating that ion transport in bulk volume and ion channels is diffusion controlled. The diffusion mechanism was also supported by the fact that large-MW PEG did not affect ion channels although conduction in bulk was diminished. In addition, plots of the slope of ion channel conductivity versus bulk conductivity enabled estimation of channel permeability for the nonelectrolytes. Based on nonelectrolyte permeability data,  $\alpha$ -toxin was shown to form channels with a radius of 13.5 Å, latrotoxin formed 9.4 Å radius channels, and the N-terminal 16 kD fragment of  $\alpha$ -toxin formed 13.1 Å radius cationic channels. Figures 8; tables 1; references 26: 12 Russian, 14 Western.

### Stability of Hemoglobin-Loaded Liposomes

917C0550F Moscow BIOLOGICHESKIYE  
MEMBRANY in Russian Vol 8 No 3, Mar 91  
(manuscript received 30 May 90) pp 292-296

[Article by M. A. Sablina, I. P. Ushakova, G. A. Serebrennikova and R. P. Yevstigneyeva, Moscow Institute of Fine Chemical Technology imeni M. V. Lomonosov]

UDC 577.352.26+591.111.2

[Abstract] Five(6)-Carboxyfluorescein labeled control and methemoglobin-loaded liposomes were tested for stability on exposure to bovine serum. Determinations of

$\tau_{1/2}$  values at 25°C in buffer A [sic] and serum yielded the following respective values for the designated liposomes: phosphatidylcholine—7.42 and 4.81 h, phosphatidylcholine:cholesterol (1:1 by wt.)—260 and 190 h, phosphatidylcholine:sphingomyelin (9:1)—23.2 and 7.75 h, and hydrated phosphatidylcholine—193 and 150 h. The  $\tau_{1/2}$  values for the analogous methemoglobin-loaded liposomes (hemosomes) were 4.80 and 2.38 h, 197 and 175 h, 13.2 and 2.92 h, and 87.7 and 53.6 h. The results showed that encapsulation of hemoglobin had an adverse impact on liposome stability and that stability was degraded by exposure to serum. In all cases phosphatidylcholine:cholesterol liposomes were shown to be the most stable vehicles. Tables 1; references 14: 3 Russian, 11 Western.

### High-Frequency Electric Field (HFEF)-Induced Transient Low-Frequency Deformations in Erythrocytes

917C0550G Moscow BIOLOGICHESKIYE  
MEMBRANY in Russian Vol 8 No 3, Mar 91  
(manuscript received 10 Jul 90) pp 297-313

[Article by V. L. Kononenko and M. R. Kasimova, Institute of Chemical Physics imeni N. N. Semenov, USSR Academy of Sciences, Moscow]

UDC 576.5

[Abstract] Micropotometry of HFEF-induced transient deformations in human erythrocytes were complemented by mathematical analysis designed to further define viscoelastic properties of erythrocyte membranes. The low-frequency deformations were induced by 0.03-500 Hz HFEF subject to 40-60 percent amplitude modulation at room temperature in isotonic (0.29 M D-mannitol, 5 mM glucose) 1 mM phosphate buffer at pH 6.1, 6.3, 6.5 and 7.4. Graphical depiction of the results showed that with a field strength of 400-600 V x cm<sup>-1</sup> essentially nonlinear, nonresonant oscillations were induced, with the amplitudes of deformation falling rapidly at  $\omega = 1$  Hz. For mathematical treatment the HFEF-induced stretching of the erythrocytes was treated as ellipsoidal elongation. The differential equations derived from this model described both static and dynamic elastic properties of erythrocyte membranes in response to stepwise changes in the amplitude of HFEF. For erythrocytes in low-ionic strength buffers the viscoelastic relaxation time is lower than under normal physiological conditions and inversely related to pH:  $\tau < 0.03$  sec at pH 7.4;  $\tau = 0.05$  sec at pH 6.5,  $\tau = 0.06$  sec at pH 6.3, and  $\tau = 0.11$  sec at pH 6.1. Figures 6; references 20: 11 Russian, 9 Western.

### Long-Term Prediction and Computer Simulation of Epizootic Plague

917C0520C Alma-Ata ZDRAVOOKHRANENIYE  
KAZAKHSTANA in Russian No 3, Mar 91 pp 28-29

[Article by M. A. Dubyanskiy, L. D. Dubyanskaya, V. M. Stepanov, A. V. Sudbin, S. K. Bogatyrev and O. A. Baytanayev, Central Asian Antiplague Institute, USSR Ministry of Health, Alma-Ata]

UDC 559.32:619.9-036.2

[Abstract] A cursory analysis is provided of the patterns of epizootic plague in endemic regions as a basis for predicting future trends and serious outbreaks. Based on patterns observed since 1951 it has become possible to predict future outbreaks through the year 2000, although the method remains manual and tedious. A computer program has been written which will greatly ease the task of monitoring the plague situation and provide much more accurate predictive indicators at the local level.

### Heterogeneity of Influenza A (H3N2) Viruses 1987-1988 Epidemic

917C0520D Alma-Ata ZDRAVOOKHRANENIYE  
KAZAKHSTANA in Russian No 3, Mar 91 pp 43-45

[Article by I. L. Kolyvanova, K. Kh. Zhumatov, R. U. Beysembayeva, S. A. Niyetkaliyeva, A. T. Ismagulov, M. Kh. Sayatov and M. G. Shamenova, Scientific Research Institute of Epidemiology, Microbiology and Infectious Diseases, Alma-Ata]

UDC 578.832.1:616-036.2:616-02

[Abstract] A multifaceted analysis was conducted on influenza A (H3N2) viruses isolated in the 1987-1988 epidemic in Alma-Ata. The results showed that the three basic types isolated in Alma-Ata were most closely related to the standard A/Philippines/2/82 isolate. The isolates displayed low infectious and hemagglutination activities ( $10E3$  to  $10E5$  EID<sub>50/0.2ml</sub>), and multiplied poorly at 32°C ( $10E2$  to  $10E3$  EID<sub>50/0.2ml</sub>) and not at all at 40°C.

### Early Diagnosis of Leptospirosis

917C0565 Moscow SOVETSKAYA MEDITSINA  
in Russian No 2, Feb 91 pp 78-80

[Article by L. P. Blazhnyaya, G. V. Melnik, Yu. P. Arapov, Chair of Infectious Diseases, Kuban Medical Institute; City Infectious Hospital, Krasnodar]

UDC 616.98:579.834.115]-036.4-078

[Text] In recent years, cases of leptospirosis caused by *L. icterohaemorrhagiae* have been recorded often in Krasnodar Kray.<sup>3,7,11,13</sup> In the clinical picture of the illness, especially in the early stages, one can observe symptoms that are similar to those of many infections—particularly those such as viral hepatitis, influenza and acute respiratory diseases, meningitis, and hemorrhagic fever with kidney syndrome.<sup>1,5,14,16</sup> Considering the high morbidity rate and lethality of the illness,<sup>3,11</sup> the urgency of the problem of icterohemorrhagic leptospirosis becomes quite apparent.

The traditional methods that are used—microscopical, bacteriological, biological, and serological methods—do not solve the problems of early diagnosis, something that is very important in terms of treatment and especially prognosis.<sup>4,6,8,9</sup> The leptospirosis lysis agglutination test (LAT), which is highly touted, has only statistical value, since its results in terms of time coincide with the period of convalescence of the illness. Moreover, a negative LAT does not always preclude leptospirosis. Its data are often affected by the severity of the illness and the leptospirosis  $\gamma$ -globulin that is used for treatment purposes.<sup>13</sup> There are certain difficulties associated with working with live cultures of leptospira and with setting up the LAT itself, which requires special laboratories.

For purposes of early diagnosis of leptospirosis, a great deal of promise is held by an enzyme immunoassay that is being developed at the present time<sup>2</sup> and a very simple, inexpensive neutrophil damage index (NDI) test that is quite accessible to practical health care and has not yet been studied in the context of leptospirosis.<sup>15</sup> In the meantime, the participation of neutrophils in immune responses has been proven by many researchers.<sup>10,12,16</sup>

The advantages of the NDI test consist in the fact that capillary blood is used for the study, and it does not cause additional sensitization of the body and can be studied repeatedly in the course of the illness.

The aim of this research was to study the possibility of using NDI in 35 individuals under treatment in the infectious hospital after early diagnosis of leptospirosis. The control group consisted of 22 individuals with viral hepatitis and nine with other illnesses (serous meningitis, hemorrhagic fever with kidney syndrome, enteritis, chronic hepatitis, pneumonia, acute respiratory diseases, and allergies), as well as nine essentially healthy individuals. All the groups consisted primarily of men aged 21 to 40. The NDI was determined with the V. A. Fradkin method.<sup>15</sup> The diagnostic kit consisted of killed polyvalent leptospira vaccine.

To exclude the influence of the preservative (phenol) on the results of the study, the NDI test was studied in the leptospirosis patients with another phenol vaccine (gonovaccine) in the presence of a control—saline solution (Table 1).

**Comparative Data on the Influence of Diagnostic Kits Containing Phenol on the NDI in Leptospirosis Patients (in percent)**

Index	Leptospirosis vaccine	Gonovaccine	Saline solution
<i>n</i>	9	9	9
$\sigma$	19.5	25.9	13.5
<i>M + m</i>	65.11 + 6.5	33.55 + 8.6	31.77 + 4.5
<i>p1</i>	<0.01	>0.05	-
<i>p2</i>	<0.05	-	-

Note: *p1* is the reliability index for the saline solution; *p2*, the reliability index for the gonovaccine

In the study of the clinical manifestations of the illness, 14 individuals were judged to have a severe case of the illness, 16 a moderately severe case, and five a mild case. The hepatorenal forms of leptospirosis was observed in 17 individuals, the infectious-toxic form in 13, and the neuromeningeal form in five. Most of the patients (23) presented in the first week of the illness. In six of the individuals, the leptospirosis was complicated by infectious-toxic shock; in two, by acute renal insufficiency; in four, acute hepatic insufficiency, in three, by acute hepatorenal insufficiency; in two, by DVS [not further expanded] syndrome; and in four, by serous meningitis.

In all the patients, the illness began acutely, with phenomena of intoxication (headache in 17, myalgia in 14, weakness in 17) and elevated body temperature. High fever (39-40°C) was observed in 31 individuals, and the temperature exceeded 40°C in two patients during the first few days. In most of the individuals (24), the fever lasted four to seven days; in five, it lasted more than seven days.

Jaundice of the skin and sclerae was noted in 18 individuals when they presented. It disappeared after the first week of the illness in three individuals, lasted for two weeks in six individuals, and continued for more than three weeks in nine individuals. An enlarged liver was palpated in 31 individuals. Hepatomegaly was noted for two weeks in 10 individuals, and for more than three weeks in 15. A negligibly enlarged spleen was palpated in only five individuals.

Anemia was identified in two individuals, leukocytosis in 13; ESR acceleration to 41-60 mm/hr was noted in 50 percent. Hyperbilirubinemia was found in 16 individuals, 13 of whom demonstrated an increase in the direct fraction. In nine patients, the total bilirubin number

exceeded 90  $\mu\text{mol/l}$ . Hepatic tests changed only in a few observations (the thymol test was elevated in four individuals, the sublimate test was down in one). Twenty individuals demonstrated a rise in alanine aminotransferase activity, and in seven of those, the rise was 4-fold or greater. Aspartate aminotransferase was up in 14 individuals (moderately in 12). Ten individuals demonstrated extremely pronounced dysproteinemia (albumin-globulin coefficient less than one).

In the first few days of the illness, proteinuria was noted in 17 individuals in urinalysis; leukocyturia was noted in nine; and cylindruria was noted in seven. Blood creatinine levels were up in six individuals.

Five individuals with pronounced meningeal symptoms underwent a spinal tap, and in four of them, the liquor has a lymphocytic nature. In all the patients, a positive Pandy test and elevated protein levels were observed.

In 13 (of 17) patients, EKG changes were recorded that indicated disruption of coronary blood circulation or conductivity.

Diagnosis of the illness during the first few days and during the full-blown stage was made on the basis of clinical and epidemiological data. Confirmation of leptospirosis with the LAT was achieved in two patients during the first week, in nine during the second week, in 11 during the third week, in four during the fourth week, and in three during the second month of the illness. The data cited show that the diagnostic value of LAT is not very great.

In that connection, the NDI test was used for early detection of leptospirosis (Table 2).

**Comparative Data of NDI in the Presence of Leptospirosis Vaccine**

Index	Patients			
	Healthy individuals	Viral hepatitis	Other illnesses	Leptospirosis
<i>M + m</i>	0.055 + 0.006	0.046 + 0.01	0.324 + 0.02	
<i>p1</i>		>0.05	>0.05	<./001
<i>p2</i>		<0.001	0.001	-

Note: *p1* is the reliability index for healthy individuals; *p2*, for leptospirosis patients

The study of the NDI in the leptospirosis patients showed that it is elevated in the very first days of the illness and remains high for the entire acute period and period of early convalescence (Table 3).

NDI in Leptospirosis Patients at Various Stages of the Illness

Index	Healthy individuals	Stages of leptospirosis, by week					
		1st	2nd	3rd	4th	5th	6th
n	9	9	10	5	4	4	4
$\sigma$	0.04	0.13	0.14	0.14	0.2	0.15	0.11
$M + m$	0.05 + 0.01	0.35 + 0.04	0.35 + 0.04	0.37 + 0.06	0.27 + 0.11	0.28 + 0.08	0.25 + 0.05
p	-	<0.001	<0.001	<0.01	>0.05	<0.05	<0.05

Note: p is the reliability index for healthy individuals

Thus, the results of the study indicate the substantial and statistically reliable increase in NDI in leptospirosis patients in all periods of the illness, as compared with its index in the presence of a specific diagnostic kit—leptospirosis vaccine—in patients with viral hepatitis or other illnesses, which enables the use of that test with leptospirosis vaccine for early detection of leptospirosis.

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### Introduction of Foreign Genes Into Liver, Kidney, and Mammary Gland Cells via High-Speed Mechanical Injection of DNA

917C0495A Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 315 No 6, (manuscript received 26 Sep 90) pp 1473-1474

[Article by A. A. Alimov, V. A. Kolesnikov, A. A. Titomirov, A. V. Kazanskiy, S. I. Gorodetskiy, and A. A. Zelenin, Institute of Molecular Biology imeni V. A. Engelgardt, USSR Academy of Sciences, Moscow; Institute of General Genetics imeni N. I. Vavilov, USSR Academy of Sciences, Moscow]

UDC 575.113

[Abstract] A technique based on the bombardment of cells with tungsten microparticles bearing DNA was used successfully in two series of experiments involving the direct introduction of foreign genes into target-organ cells. The particles were accelerated with a special "cannon." The target organs in the first set of experiments were liver, kidney, and mammary gland explants from mice. Transfection was done with plasmids containing a chloramphenicolacetyl-transferase (CAT) gene under tyrosaminotransferase (pTAT-cat), *k*-casein, and  $\beta$ -casein promoters. Use of the pTAT-cat promoter was found to produce the greatest amount of CAT activity. The target organs in the second set of experiments, which studied in vivo injection, were the livers of 2- to 3-month-old Wistar rats. The transfection involved pTAT-cat plasmid DNA. Chloramphenicolacetyl-transferase was noted in all the transfected animals. The researchers point out that the merit of the technique lies in the virtually instantaneous penetration of the DNA into the cytoplasm and the cell nucleus, its ability to inject DNA through thick obstacles, and simultaneous treatment of a multitude of cells. Figures 2; references 14: 1 Russian, 13 Western.

### Molecular Cloning and Characteristics of Chromosome Copy of Human Gene Copying TNF Receptor

917C0495B Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 315 No 6, (manuscript received 13 Nov 90) pp 1475-1478

[Article by R. L. Turetskaya, D. V. Kuprash, I. A. Udalova, M. M. Azizov, and S. A. Nedospasov, Institute of Molecular Biology imeni V. A. Engelgardt, USSR Academy of Sciences, Moscow]

UDC 577.212.3

[Abstract] A 55-kilodalton human gene that codes the TNF receptor was cloned and described in the work reported here. The genome clone library in bacteriophage EMBL-3, prepared from the DNA of leukocytes of peripheral blood from healthy donors, was screened

with probes consisting of partially complementary synthetic oligonucleotides that were transformed into highly labelled radioactive probes when the single-chain ends were built up with a large fragment of DNA of *E. coli* polymerase in the presence of phosphorus-labelled deoxyribonucleotide triphosphates. Approximately 2 million independent clones were screened, with the result that a single recombinant clone containing a 13-kbp human chromosome DNA insert was isolated and purified. Subsequent hybridization with different probes demonstrated that all three segments of the homology were located within the same genome clone. A physical (restriction) map of the cloned segment of the human genome was then plotted. The DNA of the recombinant clone was cleaved with restrictases KpnI, PvuI, and BglI and partially hydrolyzed with restrictases EcoRI, SmaI, HindIII, and PvuII; that was followed by electrophoresis and blot hybridization. Additional oligonucleotide primes were synthesized to produce information of greater detail on the topography of the TNF receptor gene. The researchers found that the various probes corresponded to different gene exons and were separated by several thousand nucleotide. However, 800 bp from the 3'-end region of the cDNA belongs to one exon, such that the corresponding sequences of the cDNA and the chromosome copy of the gene were collinear. The data indicate that the TNF receptor gene has at least five exons. The distances from the beginning of the cDNA homology segment to the beginning of the insertion and from the end of the cDNA sequence to the end of the insertion were 300 bp and 100 bp, respectively. Figures 2; references 15: 1 Russian, 14 Western.

### Modulation of Gene Expression of *Y. Pestis* 65 MD Plasmid by Host Genome

917C0581A Moscow MOLEKULARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA in Russian No 4, Apr 91 (manuscript received 13 Apr 90) pp 7-10

[Article by S. A. Lebedeva, L. S. Kuznetsova, O. K. Bichul, A. S. Chernyavskaya and M. I. Zarenkov, State Scientific Antiplague Institute, USSR Ministry of Health, Rostov-on-Don]

UDC 579.842.23:579.252.5

[Abstract] Conjugation studies were performed to determine the feasibility of transfer and expression of the 65 MD plasmid of *Y. pestis* to other yersiniae and *E. coli*. *Y. pestis* (pLS759)—bearing the cointegrate pLS79 which incorporates 65 MD, transmissible plasmid pKA7(Ap<sup>R</sup>) and transposon Tn5—served as the donor and *Y. pseudotuberculosis*, *Y. enterocolitica*, *Y. pestis* EV76 and *E. coli* CA as the recipients. Analysis was based on production of mouse and Fraction 1 toxins which are encoded by the plasmid. The results showed that 65 MD was transferred to the other yersiniae, including the vaccine strain *Y. pestis* EV76, and that expression was more efficient at 40°C than at 37°C. *E. coli* CA failed to exhibit any appreciable levels of toxin formation at

either temperature. These findings indicate that toxin-producing variants of many *Yersinia* spp. may arise in nature during epizootic processes. Figures 2; tables 2; references 10: 7 Russian, 3 Western.

**Bacterial Genome Modulation of Expression and Behavior of Ca-Dependence Plague Bacillus Plasmid**

917C0581B Moscow MOLEKULARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA in Russian No 4, Apr 91 (manuscript received 13 Apr 90) pp 10-13

[Article by L. S. Kuznetsova, S. A. Lebedeva, N. N. Grebtsova, A. S. Chernyavskaya and M. I. Zarenkov, State Scientific Antiplague Institute, USSR Ministry of Health, Rostov-on-Don]

UDC 579.842.23:579.252.9]:[579.222:546.41]

[Abstract] A study was designed to determine whether the plasmid 47 MD of *Y. pestis*, a putative virulence plasmid which is responsible for temperature-sensitive Ca-dependence (Cad), can be transmitted to other yersiniae via conjugation. *Y. pestis* 556/Otten (pSL77/Cad<sup>+</sup>), bearing the cointegrate incorporating transmissible plasmid pKA7 and transposon Tn7, was used as the donor, *Y. enterocolitica*, *Y. pseudotuberculosis*, *Y. pestis* TS and *E. coli* CA served as the recipients. Analysis of the results on selective media demonstrated that the Cad<sup>+</sup> trait was transmitted to the other yersiniae. DNA analysis on *E. coli* demonstrated that although the Cad gene was transmitted and remained intact, Ca-dependence was not imparted presumably due to changes in the plasmid vector. Perseverance of the Cad gene in *E. coli* was shown by its successful back-transmission to *Y. pestis*. Tables 2; references 13: 2 Russian, 11 Western.

**Genome Nucleotide and Complete Protein Amino Acid Sequences of Tick-Borne Encephalitis Virus (TBEV) 205**

917C0581C Moscow MOLEKULARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA in Russian No 4, Apr 91 (manuscript received 13 Mar 90) pp 23-29

[Article by P. F. Safronov, S. V. Netesov, T. P. Mikryukova, V. M. Blinov, Ye. G. Osipova, N. N. Kiseleva and L. S. Sandakhchiyev, All-Union Scientific Research Institute of Molecular Biology; "Vektor" Scientific Industrial Association, USSR Ministry of Medical

Industry, Novosibirsk Oblast; Scientific Research Institute of Vaccines and Sera; "Virion" Scientific Industrial Association, USSR Ministry of Medical Industry, Tomsk]

UDC 578.833.26:578.224:577.212.3

[Abstract] Sequencing studies were performed on the genome and proteins of TBEV 205 to complement information available for the other two major strains in the USSR, Sofia and Neudoerff. The information presented includes the complete sequence for the 10,446 nucleotide cDNA and pertinent information on the amino acid sequences of proteins C, E and NS5. The data indicate that 205 and Sofia are more closely related than either is to Neudoerff. In addition, detailed information of this kind forms a solid basis for engineering attenuated TBEV vaccines. Figures 4; tables 2; references 20: 5 Russian, 15 Western.

**Cloning of B-Galactosidase Genes of Industrial Streptococcus Lactis 111 in E. Coli and Conjugative Transmission to Thermobacillus Thermophilus**

917C0581D Moscow MOLEKULARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA in Russian No 4, Apr 91 (manuscript received 31 May 90) pp 3-7

[Article by S. V. Molotov, D. Ye. Duzhiy, V. N. Danilevich and V. V. Sukhodolets, All-Union Scientific Research Institute of Genetics and Selection of Industrial Microorganisms, Moscow]

UDC 579.862.1:[579.222:577.152.321]:579.253

[Abstract] *Streptococcus lactis* 111 was employed as a donor of the  $\beta$ -galactosidase gene, located on a 50 kbp plasmid, in conjugation studies with *Streptococcus thermophilus* RF1 (Lac<sup>-</sup>, Rf<sup>R</sup>, Fuz<sup>R</sup>), with the intention of preparing high-production industrial strains. A plasmid was subsequently isolated from *Str. thermophilus* clones displaying high-level expression of the  $\beta$ -galactosidase gene and led to subcloning in *E. coli* TG1. Restriction analysis led eventually to the identification of the  $\beta$ -galactosidase gene as a 4.8 kbp fragment of plasmid vector pBR32. The degree of expression of the gene in *E. coli* was predicated on the size of the final vector (pCB20), since the gene itself occupied only a 1.2 kbp fragment. Figures 4; tables 2; references 13: 7 Russian, 6 Western.



**Group- and Type-Specific Antibodies to gag Gene p26 Protein of HIV Immunological Type 2 in Infected Individuals**

917C0556G Moscow BYULLETEN  
EKSPERIMENTALNOY BIOLOGII I MEDITSINY  
in Russian Vol 111 No 3, Mar 91 pp 283-284

[Article by S. Yu. Klyushnik, L. M. Selimova, T. V. Veselovskaya, V. M. Zaydes, Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow]

UDC 616-092:612.017.1.064]-07:616.153.962.4-097:[578.828.6:578.224]-078.333

[Abstract] Radioimmunoprecipitation assay (RIPA) was used to analyze sera containing antibodies to HIV-2. The sera were isolated from individuals from West Africa and contained extracts with <sup>14</sup>C-proteins of HIV-2 and HIV-1. RIPA of the homotype specimens demonstrated precipitation of viral glycoproteins with high molecular mass. Only four of the seven sera for HIV-2 precipitated the gag p26 protein in the homologous RIPA, but all sera were active in relation to gp170. Three sera precipitated the HIV-1 gag p24 protein in the heterologous assay. In one case, only the homologous antigen, gag p26, was found in the immunoprecipitate; in another case, only the heterologous antigen. The assay system was such that activity of group-specific antibodies in heterologous reaction was more effective than total anti-p26 gag activity in homologous reaction. Figures 1; references 5: 2 Russian, 3 Western.

**Postvaccination Reaction in Papio Hamadryas to Injection Attenuated Venezuelan Equine Encephalomyelitis Virus Strain 15**

917C0556H Moscow BYULLETEN  
EKSPERIMENTALNOY BIOLOGII I MEDITSINY  
in Russian Vol 111 No 3, Mar 91 pp 287-290

[Article by A. G. Filatenko, G. G. Khaltayeva, Ye. P. Lukin, S. G. Gorban, M. F. Khamitova, N. N. Shkurnikova]

UDC 615.371:578.833.26].015.4

[Abstract] The use of the attenuated strain of VEE virus TC-82 (used in the United States) as a live vaccine has reduced the number of cases in which laboratory workers become infected with the virus via inhalation of airborne virus. The vaccine, however, has certain undesirable side effects, a fact that prompted the researchers here to investigate the possibility of using strain 15 for such purposes. Tests on *Papio hamadryas* monkeys were found to produce no serious side effects or clinical complications involving the CNS. Virtually all the immunized animals exhibited serological restructuring. Strain 15 produced none of the adverse effects observed in the Trinidad strain and did confer immunity to all the animals, as evidenced by the seroconversion. A postvaccination reaction consisting of a moderate, brief fever was observed, however, in 30 percent of the monkeys when the dose was raised by a factor of 10<sup>3</sup>. References 13: 4 Russian, 9 Western.

**Local Treatment of Burns of Esophagus Through Endoscope by Methods of Laser Therapy and Glue Application**

917C0507 Leningrad VESTNIK KHIRURGII IMENI I. I. GREKOVA in Russian Vol 135 No 11, Nov 90 pp 62-63

[Article by Yu. V. Sinyev, A. V. Kovanev, Ye. A. Luzhnikov et al.; Department of Urgent Endoscopic Research (head—professor Yu. V. Sinyev); All-Union Center for Treatment of Acute Poisonings (head—Ye. A. Luzhnikov); Moscow Municipal Scientific Research Institute of First Aid imeni N. V. Sklifosovskiy]

UDC 616.329-001.37: [615.849.19+616-089.819

[Abstract] Study of 180 patients (97 men and 83 women) ranging in age from 15 to 87 years, with chemical burns of the esophagus involved placement of the patients in one of three groups of 60 patients each. Group 1 received complex therapy with use of a method of local laser therapy. Group 2 received complex therapy with use of glue applications. Group 3 (control) received traditional treatment with use of antibacterial, hormonal and spasmolytic preparations. Local treatment through an endoscope by application of a biological active and bactericidal glue MK-14 and local endoscopic laser therapy with use of an LG-75 helium-neon laser included traditional conservative therapy. Use of these local methods of treatment accelerated healing of the mucous membrane, epithelialization of erosions and ulcers and organization of granulations in the esophagus wall in comparison to rates of healing after traditional therapy. The laser treatment shortened and suppressed the phase of purulent infiltration in the esophagus wall and stimulated regeneration processes. The glue applications formed a protective film and produced prolonged bactericidal effect, preventing multiplication of pathogenic microflora in the wound. Epithelialization of ulcers in the control group after a burn began only in the third week while laser therapy produced pronounced signs of epithelialization of ulcers by the second week. A study of results of the use of laser therapy and glue applications from two months up to three years confirmed the great superiority of this method of treatment over conventional methods. References 3: Russian.

**Sociopsychological Aspects of New Management Methods at Health Facilities**

917C0544A Moscow ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII in Russian No 3, Mar 91 (manuscript received 14 Nov 89) pp 13-15

[Article by M. A. Tatarnikov, V. Yu, Semenov and V. F. Taraskin, Moscow]

[Abstract] A 1989 questionnaire study among medical personnel in Leningrad and Novokuznetsk health facilities was conducted to assess attitudes toward the new forms of health economics and administration. The

overall results demonstrated a negative attitude on the part of 34.6 percent of the respondents; 45.6 percent were undecided and only 19.8 percent were in favor of the changes. In Leningrad 23.1 percent of the physicians were in favor of the new trends and in Novokuznetsk only 16.2 percent, while the corresponding figures for those opposed were 28.4 and 41.4 percent. In addition, the study also revealed that the new economic policy was approved by 27.2 percent of the hospital and 9.4 percent of the polyclinic personnel in Leningrad, with respective figures of 16.4 and 16.9 percent in Novokuznetsk. These results reflected to a large extent the social and financial experiences and expectations of the medical personnel. In particular, the study demonstrates that more active measures will have to be utilized to overcome the prevalent demoralizing climate in Soviet medicine.

**Work Standards, Cost Accounting and Salaries of Medical Personnel**

917C0544B Moscow ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII in Russian No 3, Mar 91 (manuscript received 26 Jan 90) pp 15-16

[Article by V. A. Gavrilov, All-Union Scientific Research Institute of Social Hygiene, Economy and Health Administration imeni N. A. Semashko, USSR Ministry of Health, Moscow]

UDC 614.2:331.2

[Abstract] The introduction of market economy into the Soviet health sector has emphasized the fee-for-service concept as a key factor in setting salaries of medical personnel. Accordingly, implementation of the concept of equal pay for equal work will require extensive and detailed analyses of all aspects of medical care, including time management studies. The resultant data will then be used to establish regionally-related performance standards which will form the basis for renumeration of the various categories of medical personnel. Tables 1; references 3: Russian.

**Action of Low-Intensity, Near-IR Laser Irradiation on Certain Functional-Metabolic Parameters of Isolated Rat Myocardium in Hypoxia**

917C0556C Moscow BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY in Russian Vol 111 No 3, Mar 91 pp 247-249

[Article by L. D. Lukyanova, I. M. Denisov, S. V. Zamula, S. M. Meller, Laboratory of Bioenergetics, Scientific Research Institute of Pharmacology, USSR Academy of Medical Sciences, Moscow; Chair of Introductory Stomatological Faculty, Medical Institute imeni N. A. Semashko]

UDC

615.849.19.015.4:(612.172/.173.06:612.273.2).085.23

[Abstract] Low-intensity, IR semiconductor lasers operating in the near-IR range are known to have biological activity and deep penetration in tissue. They are effective in a number of fields of therapy, with particularly positive outcomes associated with coronary insufficiency. The mechanism of their biological and therapeutic action, however, is unclear, and researchers are unsure of the target of the laser action (molecular, subcellular, or cellular?). Such questions are best studied on relatively simple functional-metabolic models, and the researchers here chose to focus on the parameters of the isolated contracting heart in acute oxygen insufficiency, primarily because such a model enabled them to pinpoint rapid, quantitative changes in the specific contractile function of cardiomyocytes. The test animals were white outbred male rats (150-200 g) that were first separated into two groups: those with high resistance to hypoxia, and those with low resistance. Acute hypoxia was modeled by lowering the oxygen content to 20 percent in the perfusate and replacing it with nitrogen (the G<sub>20</sub> model). An infrared 3-W pulsed power AML T 01 laser operating at  $\lambda = 0.89 \mu$  was used, with a pulse train frequency of 400 Hz. Exposition time was 20 minutes. The researchers found that in the post-hypoxia phase, heart beat was fully restored, with the activation phase especially pronounced in the myocardia of the high-resistance group, with normalization following. The laser irradiation reduced the depressive effect of G<sub>20</sub> on cardiac contractile strength in the myocardia of the high-resistance group and accelerated its recovery in the post-hypoxia phase. It did not, however, produce a

protective effect on the same parameter in the low-resistance group. The irradiation enhanced respiration rate and perfusate flow rate during and after G<sub>20</sub> in the high-resistance group, but had the opposite effect on the low-resistance group. Figures 2; references 6: Russian.

### The Effect of He-Ne Laser Radiation on Indices of Myocardial Energy Metabolism

917C05561 Moscow BYULLETEN

EKSPERIMENTALNOY BIOLOGII I MEDITSINY  
in Russian Vol 111 No 3, Mar 91 pp 302-305

[Article by G. K. Chizhov, N. I. Kovalskaya, V. I. Kozlov, Department of Biomedical Research, Scientific Research Institute of Laser Surgery, USSR Ministry of Health; Morphology Laboratory, Second Moscow Medical Institute imeni N. I. Pirogov, Moscow]

UDC 616.127-008.9-02:615.849.19]-07

[Abstract] In light of the positive track record of He-Ne laser irradiation used in various capacities to treat the effects of heart disease, the researchers here chose to study the effect of an LG-75 He-Ne laser (632.8 nm) with an output of 2-4 mW on histochemical indices of the energy metabolism of the myocardia of white outbred male rats (250 g). Intravenous irradiation resulted in elevated activity in terms of G-6-PDH, LDH, SDH, NADH-DH, as evidenced by the elevated activity of myocardiocytes. In vitro irradiation produced similar results, but the activity was less pronounced, with SDH and NADH-DH close to control levels. Figures 2; references 15: 14 Russian, 1 Western.

**Combined Therapy of Stomach Cancer With Use of Hydroxyradiotherapy**

917C0438 Leningrad VOPROSY ONKOLOGII  
in Russian Vol 36 No 11, Nov 90 pp 1349-1353

[Article by V. A. Kosse; Order of the Labor Red Banner Medical Institute; Dnepropetrovsk]

UDC 616.33-006.6-089:/615.835+615.849]-036.8

[Abstract] The first experience in the use of hydroxyradiotherapy in treatment of stomach cancer was assessed according to results of treatment of 456 patients with stomach cancer. Group 1 (271 persons) received surgical treatment and 185 patients underwent combined therapy including presurgical irradiation (83 patients-group 2) under ordinary conditions or with hydroxyradiotherapy (102 patients-group 3) with use of a gaseous mixture containing 8 percent O<sub>2</sub> for inhalation during irradiation. Radiation dose was 4 Gy three times a week with total focal dose of 40 Gy in 10 parts. The study included 308 men and 148 women ranging in age from 25 to 75 years. Effectiveness of the radiation therapy did not depend upon the histological form of the tumor but there was a tendency to a decrease in percentage survival for differentiated tumors. The procedure decreased the frequency of general radiation reactions in comparison to that which occurred after irradiation under usual conditions (total focal dose-32 Gy in eight parts). The study showed clear-cut advantages of this method of combined therapy of stomach cancer, especially the metastasized form. It promoted an increase of resection rate by 15-17 percent due to tumor regression and increased the survival rate of patients almost 2-fold with no increase in the number of post-surgical complications nor mortality. Hydroxyradiation with use of the 8 percent oxygen admixture greatly reduced general radiation reactions after large-field irradiation and permitted increases of dosage which improved the remote results of treatment even more. References 8: Russian.

**Antishock Effect of Opiate Antagonists**

917C0442A Kiev KLINICHESKAYA KHIRURGIYA  
in Russian No 12, Dec 90 (manuscript received  
4 May 90) pp 15-16

[Article by D. M. Sherman and I. V. Mikulyak, District Military Hospital, Lvov]

UDC 616-001.36-08

[Abstract] The effect of the opiate antagonists nalorphine and naloxone on the course and outcome of experimental traumatic shock was investigated on 86 pubertal rabbits (2.6 kg). Seven series of experiments were conducted in which the animals were administered nalorphine (0.5-2 mg/kg) or naloxone (0.1 mg/kg) in the early or late periods of shock. The results demonstrated that the therapeutic effect was observed primarily when the drugs were administered in the early phase of shock.

In addition, whereas nalorphine extended life, naloxone was more likely to spare life. Finally, the therapeutic effect in the late period is clearly inadequate.

**Hemosorption in Conventional Treatment of Acute 1,2-Dichloroethane Poisonings**

917C0509B Kiev VRACHEBNOYE DELO in Russian  
No 5, May 91 (manuscript received 10 Sep 90) pp 38-40

[Article by O. V. Kurashov and V. A. Trotsevich, Municipal Clinical Emergency Hospital]

UDC 615.917:547.412.4:616.15-02:616.61-078

[Abstract] The effect of including hemosorption in the conventional treatment of dichloroethane poisonings was investigated on 41 patients with acute dichloroethane poisoning in 1987-1989. The subjects ranged in age from 5 to 68 years, with doses ranging from 15 to 200 ml. Dichloroethane poisonings account for 5 percent of the total number of poisonings in the USSR and have a 50 percent hospital mortality rate. Exotoxic shock occurs in 86.5 percent of cases and is the cause of death for more than 90 percent of victims that succumb within 24 h. Conventional treatment involved rinsing of the stomach and administration of curantyl, ascorbic acid, prednisolone, and ascorutin. Hemosorption treatment involving Seldinger catheterization of the subclavian and femoral veins began 2-4 h after admittance. The total amount involved was two to four total circulating volumes and treatment lasted 1-2 h. Twenty-nine subjects improved after one treatment; four did not improve and subsequently died. Specific antidote therapy with vitamin E and acetyl cysteine was initiated after the first hemosorption treatment. In addition, symptomatic therapy with essentielle, silybor [sic], and lipamide was included. The results demonstrated that the use of hemosorption in acute dichloroethane poisonings effectively helps to remove dichloroethane and its metabolites from the body and thus decreases the number of complications and the mortality rate. References 2: Russian.

**Inhalation Therapy for Respiratory Tract Burn Patients**

917C0510A Kiev ZHURNAL USHNYKH, NOSOVYKH I GORLOVYKH BOLEZNEY in Russian No 3,  
May-Jun 91 (manuscript received 27 Apr 90) pp 20-23

[Article by S. K. Boyenko, Department of Otorhinolaryngology, Advanced Training of Physicians Faculty, Donetsk Medical Institute imeni M. Gorkiy]

UDC 616.211/.232-001.17

[Text] Respiratory tract burns often result in impairments in the evacuatory function of the tracheobronchial tree, which contribute to the development of respiratory insufficiency, sharply deteriorating the prognosis of such afflictions (R. N. Shatrushenko, 1967; L. M. Klyachkin,

V. M. Pinchuk, 1969). Therefore, prompt drainage of the respiratory tract is an important task in the treatment of victims of respiratory tract burn. For this purpose we use fibrobronchoscopy (L. I. Gerasimova et al., 1979; L. P. Loginov et al., 1980; V. K. Sologub et al., 1980; S. K. Boyenko, E. P. Bogachev, 1988), inhalation therapy (V. G. Borisov et al., 1974; M. N. Anichkov, I. V. Vigdorichik, 1975; R. D. Ryabaya, R. I. Kravchenko, 1980; S. K. Boyenko, 1985), and respiratory gymnastics (L. I. Gerasimova et al., 1979; V. Rudovskiy et al., 1980). Tracheostomy as a method of draining the tracheobronchial tree, which is not used currently, is conducted only in critical situations (M. I. Kuzin et al., 1982; S. K. Boyenko, 1988).

We observed 415 patients with respiratory tract burns: 233 (56.2 percent) had mild afflictions, 84 (20.2 percent) experienced problems of average severity, and 98 (23.6 percent) were in serious condition.

We compared the clinical course of the disease with data from endoscopic research, including fibrobronchoscopy. We investigated the permeability of the nasal cavity for respiration, its secretory capacity and the reflex irritability of its mucous membrane, the conditioning, olfactory, and absorptive functions, and the permeability of the bronchi.

Alterations in the respiratory tracts in the victims develop in a certain sequence. This made it possible for us to isolate the five stages of the clinical course of respiratory tract burns and define their morphofunctional characteristics (S. K. Boyenko, 1988).

The purpose of this research was to develop inhalation therapy for respiratory tract burns with consideration of the nature of the main impairments in each stage and also their severity.

The most adverse signs of the first stage of respiratory tract burns, the mucostasis stage (2-4 h after injury) are diminished secretory and transport capacity of the respiratory tract, suppression of the reflex irritability of the mucous membrane, and impairment of the absorptive function. Therefore, during the mucostasis stage, fibrobronchoscopy must be employed first to evacuate the aspirated products of combustion from the tracheobronchial tree (S. K. Boyenko, Ye. P. Bogachev, 1988). Moreover, we are trying to stop the pathological pulsation from the injured mucous membrane of the respiratory tracts by means of inhalation of a 0.5 percent novocaine solution.

The second stage, hypersecretion, lasts 18-24 h and is characterized by enhanced mucous secretion and the onset and increase in edema of the respiratory tract mucous membrane. In this stage it is necessary to continue evacuation of the mucous and aspirated combustion products from the tracheobronchial tree. In order to reduce edema of the mucous membrane and diminish hypersecretion we employ corticosteroid inhalation, usually 125 mg of hydrocortisone per procedure.

Beginning the second day following the injury, secretion begins to diminish, edema of the tissues increases, and the third stage of injury to the respiratory tract begins, the stage of drying of the mucous membrane. It ceases at the beginning of the toxemia period with the formation of the first scabs in the nasal cavity. With the improvement in the absorptive function of the respiratory tract at this stage, inhalation of all-purpose drugs should begin.

The most difficult task is therapy of the respiratory tract burn victims in the fourth stage, which is obstruction of the respiratory tract. It begins three to four days after the injury and encompasses the periods of toxemia and early septicotemia. The presence of scabs in the nasal cavity is a direct sign of the stage of respiratory tract obstruction. The scabs exacerbate the functional impairments of the respiratory tract, which is most pronounced in this stage.

The victims in serious condition experience difficulty in nasal respiration, and respiration through the mouth results in drying of the mucous membrane in the lower sections of the respiratory tract. It also facilitates the formation of scabs in the trachea and bronchi. The scabs, heavy disengagement of the epithelium, and edema of the submucosa result in constriction and diminished permeability of the bronchial lumen. One of the reasons for a delay in the evacuation of desquamated epithelium and scabs is injury to the respiratory apparatus of the respiratory tract mucous membrane, which stems from a decrease in the number of nerve elements due to their destruction and death the first week following the injury (S. K. Boyenko, 1988).

Aerosol therapy is employed in order to manage obstruction of the respiratory tract, in addition to measures such as fibrobronchoscopy treatment, cleansing of the nasal cavity, and respiratory exercises. With aerosol therapy, we also use subsequent inhalation of two mixtures: mixture No 1, which includes 5 ml of a 1 percent solution of ephedrine, 1 ml of a 1 percent solution of dimedrol, 5 ml of a 4 percent solution of soda, and 125 mg of hydrocortisone, and then 15 ml mixture No 2 from a tincture of thermopsis (1.0-200.0), plantain, and coltsfoot leaves (15 g). The ephedrine solution was included in mixture No 1 due to its bronchodilatory effect and its effect on the activity of the fibrillary epithelium. The soda solution was used for adjusting the acid-base balance of the mucous membrane in the respiratory tract. Inhalation of the herbal grass tinctures was employed on account of their expectorant and anti-inflammatory effects (V. I. Rodin et al., 1981).

Victims of respiratory tract burns need adjustment in immunity due to marked alterations in it (N. R. Panchenkov, 1984; D. Ye. Pekarskiy et al., 1984; V. Rudovskiy et al., 1980). For this purpose we liberally use a thermal humid inhalation of a 0.04 percent solution of timalin [sic], which we prepare in the following manner: 10 mg of the preparation (1 vial) is dissolved in 25 ml of 0.9 percent physiological solution. We use 5 ml of the



resultant solution (2 mg timalin) per treatment. The timalin inhalation course consists of 10-15 treatments.

Timalin acts as a local stimulant to the reparative processes in the respiratory tract, prevents the onset of infectious and destructive complications in the respiratory organs, and reduces the recovery period in pneumonia cases by 1.5- to 2-fold. The dynamics of the cellular composition of the smears taken from the laryngeal part of the throat indicated stimulation of reparative processes in 75 percent of cases.

Vitamin A is necessary for complete restoration of the injured fibrillary epithelium (G. B. Fedoseyev et al., 1980). In view of this, at the end of second and beginning of the third weeks after the injury in the stage of respiratory tract obstruction we perform lubricating inhalation with vitamin A on a daily basis after preliminary application of mixture No 1 or the expectorant herbal tinctures. We continue the lubricating inhalation of vitamin A into the fifth stage, the morphological and functional restoration of the mucous membrane in the respiratory tract. This course usually consists of 15-20 procedures.

In mild burns of the respiratory tract, we consider inhalation of the medicinal aerosols the primary means for treating victims.

Depending on the stage and degree of injury, inhalation therapy of respiratory tract burn patients prevents the onset of infection in the respiratory tract and facilitates draining of the tracheobronchial tree, and reduces the treatment period for such patients by three to five days.

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#### Effect of Varying Doses of Mexamine on Systemic Hemodynamics

917C0511B Moscow *RADIOBIOLOGIYA in Russian* Vol 31 No 1, Jan-Feb 91 (manuscript received 23 Feb 88) pp 144-147

[Article by V. G. Vladimirov, S. M. Smirnova, Yu. G. Boyko, Military Medicine Scientific Research Institute, Moscow Oblast USSR, Leningrad]

UDC 577.391.612.824.1

[Abstract] The effect of various doses of mexamine, a radioprotective agent, on systemic hemodynamics was investigated in albino rats (180-200 g). Mexamine was administered intraabdominally in doses of 2.5, 7, and 11 mg/kg, with thermodilution employed to measure blood pressure, minute circulating volume, total peripheral resistance, and systolic volume 10, 20, 30, and 60 min after administration. The data demonstrated that a 2.5 mg/kg dose of mexamine induced mild bradycardia. Total peripheral resistance peaks 30 min after injection at 185 percent of normal, while systolic volume and minute circulating volume diminished by 30-50 percent. The 7 mg/kg dose was shown to upset the hemodynamics substantially. Total peripheral resistance was 2.0- to 2.5-fold above baseline 10 min after the injection, with systolic volume and minute circulating volume exhibiting 50-55 and 50-75 percent drops, respectively. Blood pressure was 70-80 percent of normal. Doses of 11 mg/kg mexamine yielded essentially the same results as the 7 mg/kg dose, indicating the onset of a "saturation effect". The substantial radioprotective effect of mexamine at a dose of 7 mg/kg is attributed to the fact that it significantly alters systemic hemodynamics. Figures 1; references 5: 4 Russian, 1 Western.

#### Investigation of Anti-Radiation Properties of Betamide Under Conditions of Sublethal and Lethal $\gamma$ -Radiation Exposure

917C0511D Moscow *RADIOBIOLOGIYA in Russian* Vol 31 No 1, Jan-Feb 91 (manuscript received 12 Feb 90) pp 151-153

[Article by V. B. Tenchova and T. P. Pantev, Scientific Institute of Nuclear Medicine, Radiobiology, and Radiation Hygiene, BMA [as published], Sofia, People's Republic of Bulgaria]

UDC 577.391.615.771.8

[Abstract] The antiradiation effect of the novel preparation betamide [sic] (3[2-N-thiophosphate-ethylamine] propionamide hydrate) on hemopoiesis, the gastrointestinal tract, and nucleic acid concentration in leukocytes was evaluated in male C57BL mice (25-28 g) following exposure to  $^{137}\text{Cs}$  gamma radiation in lethal and sublethal doses (0.019 Gy/s, in doses of 4, 7, and 9 Gy). Betamide, a combination of WR-2 721 and WR-2 529 radioprotectors, was injected in a dose of 500 mg/kg intraperitoneally 15 min prior to radiation exposure. Data collected three and nine days later demonstrated that the number of nucleated cells in the bone marrow of the protected animals was much higher than in the control group at all three doses. Information on changes in the cellularity of the bone marrow in the femur and the mass and cellularity of the spleen of the experimental cohort indicates that betamide diminishes the radiation damage to hemopoietic tissue. Furthermore, betamide also prevents cell destruction and preserves and stimulates the cells' ability to carry out mitosis to some degree, which is the reason for the more rapid regeneration of hemopoiesis in the experimental group. In conclusion, analysis of these results suggests that betamide reduces the cytopenic destruction of ionizing radiation in the bone marrow and spleen and accelerates restoration of hemopoiesis. Tables 1; references 3: Russian.

#### Effects of Type 1 Interferon (IF-1) on Endotoxic Shock

917C0518A Moscow *PATOLOGICHESKAYA FIZIOLOGIYA I EKSPERIMENTALNAYA TERAPIYA in Russian* No 1, Jan-Feb 91 (manuscript received 20 Feb 89) pp 59-61

[Article by Yu. N. Anisimova, I. V. Filchakov, N. Ya. Spivak and V. N. Blagodatnyy, Kiev Scientific Research Institute of Epidemiology and Infectious Diseases imeni L. V. Gromashevskiy]

UDC 616.98:579]-06:616-001.36-085.373-036.8-092.9

[Abstract] Trials were conducted on the efficacy of IF-1 in overcoming the pathogenetic mechanisms of endotoxin-induced shock in mice. Studies on 16-18 g male BALB/c and CC57 W mice showed that intraperitoneal administration of *S. typhi* endotoxin (400  $\mu\text{g}/\text{mouse}$ ) or



2 x 10E9 *S. typhimurium* cells resulted in septic shock and an attendant mortality rate of 80 percent in 24 h. Pretreatment of the mice with 10E3 IU of murine IF-1 reduced the mortality rate by 90 percent. Histopathologic studies showed that the beneficial effects of IF-1 were due to attenuation of microcirculatory pathology and organ damage, as well as enhancement of macrophage phagocytosis. The latter function was responsible for more rapid elimination of endotoxin, mitigation of endotoxin-mediated cell injury, and elimination of fibrin degradation products which otherwise would lead to disseminated intravascular coagulation. Figures 2; references 10: 8 Russian, 2 Western.

**Laser Correlation Spectroscopy of Blood Serum in Assessing the Effectiveness of Hemosorption in Myasthenia**

917C0556D Moscow BYULLETEN  
EKSPERIMENTALNOY BIOLOGII I MEDITSINY  
in Russian Vol 111 No 3, Mar 91 pp 259-262

[Article by V. S. Lobzin, I. I. Nisevich, V. S. Omelchenko, A. G. Silina, A. M. Stepanov, N. M. Zhulev, L. N. Makarenko, D. I. Rudenko, L. A. Noskin, Chair of Nervous Diseases, Leningrad Institute of Postgraduate Medicine imeni S. M. Kirov; Leningrad Institute of Nuclear Physics imeni B. P. Konstantinov, USSR Academy of Sciences; Scientific Research Institute of Hygiene and Occupational Pathology, USSR Ministry of Health]

UDC 616.74-009.17-085.38.015:615.246.2/  
-036.8-07:616.15-073.584

[Abstract] The practice of using sorption methods to treat myasthenia was examined by the researchers here. Asserting that the literature provides no satisfactory descriptions of the changes that take place in the body when such methods are used, and that the principal criterion for using efferent therapy in myasthenia is usually based in data of the clinical picture or the physician's personal experience, the researchers set out to pinpoint some of the mechanisms underlying the therapeutic action of hemosorption by way of laser correlational spectroscopy (LCS). The hemosorption was part of a combined treatment regime for 30 myasthenia patients aged 18 to 48. They had had the disease for an average of three and a half years. The LCS demonstrated that particles 1-10<sup>4</sup> nm contributed to the total scattering of the laser light before the hemosorption as well as after a two-pass session of hemosorption. It identified changes in the size of "peak" fractions and in the ratio of small to large particles. Low-molecular fractions pointed to the contribution of single-molecule fractions of proteins and lipids, whereas high-molecular fractions were more likely to belong to supramolecular complex forms. Precise identification of the peaks was possible only after special molecular-biological identification. The researchers assert that their findings describe changes in indices of homeostasis of blood serum components in myasthenia patients both before and after hemocarboperfusion. In most cases, the blood serum before hemosorption clearly differed from the serum after hemosorption. Figures 3; references 9: 4 Russian, 5 Western.

**Detection of Plasmids of Methane-Oxidizing Bacteria**

917C0498A Kiev *MIKROBIOLOGICHESKIY ZHURNAL in Russian* Vol 53 No 1, Jan-Feb 91 pp 34-38

[Article by V. A. Romanovskaya, S. M. Stolyar and Yu. R. Malashenko; Institute of Microbiology and Virology; Academy of Sciences; UkSSR; Kiev]

UDC 579.841.41.25

[Abstract] A search for plasmids in the broad spectrum of methane-oxidizing bacteria, isolated from different ecomiches and geographical regions with different geochemical conditions, involved the study of 10 strains of methane-oxidizing cultures from different zones and 22 strains provided by individuals. Many strains contained from one to five autonomously replicated plasmids with molecular weight from 4 to 100 MDalton or more. This established preconditions for population-genetic studies of methane-oxidizing bacteria. Plasmids were not found in *Methylococcus capsulatus*, *Methylococcus thermophilus*, "*Methylococcus rubra*", "*Methylococcus ucrainicus*", "*Methylovarius vinelandii*" and "*Methylocystis echinoides*". Plasmid-containing strains "*Methylomonas alba*", "*Methylovarius luteus*", "*Methylosinus thrichosporium*", "*Methylosinus sporium*", "*Methylovarius parvus*" and some unidentified plasmid-containing strains of genera "*Methylovarius*" and "*Methylosinus*" were not confined to any ecomiches nor geographical regions. References 17: 5 Russian, 12 Western.

**Study of Antistaphylococcal Activity of Thionium in Experiments In Vitro**

917C0498B Kiev *MIKROBIOLOGICHESKIY ZHURNAL in Russian* Vol 53 No 1, Jan-Feb 91 pp 82-84

[Article by G. T. Pisko and A. P. Dombrovskiy; Glukhov Pediatric Institute]

UDC 615.31:615.281

[Abstract] A study of the antistaphylococcal activity of a thionium preparation, a derivative of bis-quarternary ammonium compounds and a surfactant, synthesized at the Institute of Organic Chemistry UkSSR Academy of Sciences, determined the antistaphylococcal activity of

thionium on 114 strains of *Staphylococcus aureus*, isolated from patients in Sumy and Glukhov hospitals who had purulent-inflammatory diseases. The minimal bacteriostatic concentration and the minimal bactericidal concentration of thionium was determined by the method of series dilutions in a liquid nutrient medium. Thionium demonstrated a pronounced antimicrobial action toward all the strains of *Staphylococcus aureus* studied and produced a bactericidal or bacteriostatic action on the microorganisms according to the concentration. Minimal bactericidal concentrations of thionium (0.078-0.6 µg/ml) were two to eight times higher than minimal bacteriostatic concentrations (0.019-0.156 µg/ml). Interaction of thionium with antibiotics showed that sub-bacteriostatic doses of it intensified the antimicrobial action of benzylpenicillin 4-32 times and that of gentamycin 64-512 times regardless of the initial sensitivity of the strains to the antibiotics. References 3: Russian.

**Physiological Activity of Methanotrophic Bacteria During Their Interaction With Rocks**

917C0498C Kiev *MIKROBIOLOGICHESKIY ZHURNAL in Russian* Vol 53 No 1, Jan-Feb 91 pp 92-98

[Article by I. K. Kurdish, N. F. Kigel and O. V. Yegorov; Institute of Microbiology and Virology; UkSSR Academy of Sciences; Kiev]

UDC 579.841.41.22

[Abstract] Methanotrophic bacteria may be immobilized on rocks in coal mines in order to oxidize CH<sub>4</sub> being liberated. This study of the interaction of a mineral nutrient medium containing (in g/l): KNO<sub>3</sub>—0.50; KH<sub>2</sub>PO<sub>4</sub>—0.25; K<sub>2</sub>HPO<sub>4</sub> x 3H<sub>2</sub>O—0.25; MgSO<sub>4</sub> x 7H<sub>2</sub>O—0.30; NaCl—3.50; CaCl<sub>2</sub>—0.02; FeCl<sub>3</sub>—0.001 with such rocks and the effect of this process on the physiology of methane-oxidizing bacteria employed a *Methylomonas rubra* 15 Sh culture and rocks collected at four mines. The study established the possibility of leaching out some minerals from the rocks by water. Prolonged contact of the nutrient medium with these rocks changed the nutrient medium mineral composition and pH. Interaction of suspensions of methanotrophic bacteria with the rocks did not affect the oxidative activity of the microorganisms. Immobilization on the methanotrophic bacteria on the rock samples increased the CH<sub>4</sub> oxidation intensity by the methanotrophic bacteria. References 13: 12 Russian, 1 Western.

**Use of E. Coli Inorganic Pyrophosphatase in ELISA for Plant Viruses**

917C0592A Moscow *BIOLOGICHESKIYE NAUKI* in Russian No 2, Feb 91 (manuscript received 14 Nov 89) pp 39-46

[Article by O. A. Mizenina, O. V. Borisova, O. A. Yevtushenko, A. A. Baykov and V. K. Novikov, Chair of Virology, Moscow state University]

UDC 631.937.16:57.083

[Abstract] Modifications were introduced into conventional ELISA technology for improving sensitivity in plant virus detection, which basically consisted of the use of inorganic pyrophosphatase (IP) derived from *E. coli* for conjugation to antibody via glutaraldehyde. The resultant IP-antibody conjugates were shown to be stable at 71°C and retained full activity after one year of storage at 4°C in the presence of sodium azide. Trials with 11 plant viruses yielded sensitivity figures ranging from 1 to 15 ng/ml, findings that in most cases exceeded sensitivity obtained with alkaline phosphatase or horseradish peroxidase labeled antibodies. Sensitivity of the method was greatly enhanced by the fact that incubations could be conducted at 50°C, resulting in a more intense signal that is visually apparent and can be quantified spectrophotometrically at 630 nm. Figures 2; tables 1; references 16: 2 Russian, 14 Western.

**Strain-Dependent Responsiveness of Spring Wheat to Plant Growth Regulators**

917C0592B Moscow *BIOLOGICHESKIYE NAUKI* in Russian No 2, Feb 91 (manuscript received 15 Nov 88) pp 119-126

[Article by V. I. Sutulova and I. V. Yegorov, Plant Development Laboratory, Moscow State University]

UDC 633.11:633.162

[Abstract] Moskovskaya 35 and Leningradka spring wheats were tested for their responsiveness to treatment with chlormequat chloride (CC; chlorocholine chloride), ethephon (EP; (2-chloroethyl)phosphonic acid) and kar-tolin [sic] (KL) at test plots in the Moscow Oblast to assess strain-responsiveness relationships. The results showed that spraying during tilling with 1% CC, 0.5% EP, 1% CC + 0.5% EP, 1.5% CC + 0.25% EP, and 0.15, 0.25 or 0.5% KL had a more pronounced effect on Moskovskaya 35 wheat than on Leningradka. Specifically, on an overall basis attenuation of plant height, grain weight, spike length, spike counts and seeds per spike was more pronounced in Moskovskaya 35 wheat. At least in part, the differences are presumed to be due to the fact that Moskovskaya 35 becomes susceptible to these agents earlier in ontogeny than does Leningradka. Tables 3; references 8: 7 Russian, 1 Western.

**Pharmacodynamics of Hepatoprotectors From  
*Silybium marianum* (Blessed Milk Thistle)**

917C0509A Kiev VRACHEBNOYE DELO in Russian  
No 5, May 91 (manuscript received 22 Oct 90) pp 15-19

[Article by Zh. N. Rumyantseva, Department of Pharmacology, Ivano-Frankovskiy Medical Institute]

UDC 615.27:615.015:615.322:582

[Abstract] This article reviews the pharmacological properties of preparations obtained from *Silybium marianum* (blessed milk thistle). Various investigations have demonstrated that hepatoprotectors such as silymarin, legalon, silybinin [sic], karsil, and silybor [sic] can be employed in the treatment of acute viral, toxic, cholestatic, chronic or alcoholic hepatitis infections, and thus protect the hepatic parenchyma from various types of problems by decreasing the glutamic-pyruvic transferase activity. Other research has shown that large doses of azathioprine prevent histological and ultrastructural

changes and a glycogen deficit and suppress enzyme activity that otherwise occurs in poisonings with cadmium chloride, galactosamine, and lead acetate. In addition, silybor normalizes lipid peroxidation, eliminates hypertransaminasemia, and stimulates glycogen production in cases of partial resection of the liver. *S. marianum* preparations suppress lipid peroxidation by decreasing the number of free radicals and lipid peroxidation products in the hepatocytes. These preparations also diminish the production of lysophosphatidylcholine and necrosis of the parenchyma. Other researchers have shown that prolonged use of karsil, legalon, and silybor improves immunity indicators, increases the number of lymphocytes, and decreases the immunoregulation index. The results of these studies suggest that the effect of the *S. marianum* preparations on RNA and protein synthesis is the basis of their reparative effect. In conclusion, these findings indicate that *S. marianum* preparations can be effective in the treatment of patients with liver diseases. References 40: 17 Russian, 23 Western.

### Changes of Microcirculation During Experimental Trigeminal Neuralgia in Rats

917C0472A Moscow BYULLETEN  
EKSPERIMENTALNOY BIOLOGII I MEDITSINY  
in Russian Vol 111 No 1, Jan 91 pp 9-11

[Article by G. N. Kryzhanovskiy, M. P. Gorizontova, S. I. Igonkina et al.; Laboratory of Pathophysiology of Pain (director—Doctor of Medical Sciences V. K. Reshetnyak); Laboratory of General Pathology of Microcirculation (director—Doctor of Medical Sciences, professor P. N. Aleksandrov); Scientific Research Institute of General Pathology and Pathological Physiology; USSR Academy of Medical Sciences; Moscow]

UDC 616.8-009.7-06:616.16-008.1-092.9-07

[Abstract] Studies performed on 37 male rats involved production of experimental trigeminal neuralgia by creating a generator of pathologically intensified excitation in the caudal nucleus of the spinal tract of the trigeminal nerve. This produced signs typical of trigeminal nerve neuralgia in man. Rats were placed in one of two groups. Group 1 rats underwent injection of one minimal lethal dose of tetanus toxin into the caudal nucleus; group 2 rats received a 0.25 minimal lethal dose and control rats received injection of a 0.9 percent sodium chloride solution in the same volume. Microcirculatory disturbances appeared in the mesentery of rats receiving tetanus toxin just as in the mesentery of rats with pain syndrome of spinal origin. There also appeared an increase of venular permeability and mast cells degranulation. The changes were typical of those during pain syndrome of central origin. Unotypical changes of the microcirculation in the mesentery of rats with pain syndrome showed the microcirculation disturbances were generalized or did not depend on the location of the generator of pathologically intensified excitation. The relative normalization of the state of components of the microcirculatory system appeared clearly in rats with a less severe course of the pain syndrome. The degree of pronouncement of disturbances in the microcirculation system and appearance of signs of adaptation may help to predict the course of the pain syndrome. Figures 2; references 11: 8 Russian, 3 Western.

### Elimination of Disturbances of Electrical Stability of Heart and Arrhythmias With Aid of Synthetic Analog of Acetylcholine

Moscow BYULLETEN EKSPERIMENTALNOY  
BIOLOGII I MEDITSINY in Russian Vol 111 No 1,  
Jan 91 pp 13-15

[Article by F. Z. Meerson, I. Ya. Kalvinsh and N. A. Abdikaliyev; Scientific Research Institute of General Pathology and Pathological Physiology; USSR Academy of Medical Sciences; Moscow; Scientific Research Institute of Cardiology; Ministry of Health; KazSSR; Alma-Ata; Institute of Organic Synthesis; Lat. SSR Academy of Sciences; Riga]

[Abstract] A study of the effect of a synthetic analog of acetylcholine, ethyl 3/2-ethyl-2,2-dimethylhydrazinium/propionate iodate [EDIGIP], on disturbance of the electrical stability of the heart and arrhythmias in acute myocardial infarct and post-infarct cardiosclerosis and during acute ischemia and subsequent reperfusion involved experiments on 250-400 g male Wistar rats. A single non-toxic dose of EDIGIP against a background of myocardial infarction or post-infarct cardiosclerosis eliminated or significantly decreased disturbances of the electrical stability of the heart without changing the heart rate. Elimination of disturbances of heart electrical stability showed no cholinergic nor negative chronotropic effect of EDIGIP. A study of the effect of EDIGIP, atropine and combinations of them on ischemic and reperfusion arrhythmias in an isolated heart showed a negative chronotropic effect but did not produce an antiarrhythmic effect in local ischemia and reperfusion. The protective, antiarrhythmia effect of EDIGIP on the isolated heart occurred only in combination with atropine in the presence of bradycardia and thus is not connected with the acetylcholine-like effect of the drug but is due to its primary effect on the myocardium. References 5: 3 Russian, 2 Western.

### Surface Activity of Substance P and Its Interaction With Lipid Monolayers

917C0487B Kiev DOKLADY AKADEMII NAUK  
UKRAINSKOY SSR: SERIYA B—GEOLOGICHESKIYE,  
KHIMICHESKIYE I BIOLOGICHESKIYE NAUKI  
in Russian No 10, Oct 90 pp 66-69

[Article by V. K. Rybalchenko and B. R. Mogilevich; Scientific Research Institute of Physiology; Kiev State University]

[Abstract] A study of the surface activity of substance P (belonging to a group of tachykinins) and of the capacity of molecules of the peptide to modify liquid monolayers involved measurement of the two-dimensional pressure at the interface of the "electrolyte solution-air" phases by the Wilhelm method and the boundary potential jump by the dynamic condenser method. The study showed that substance P in physiological concentrations may interact with plasmatic membrane lipids and be incorporated into the lipid matrix. This changes the conformation of the molecule according to the hydrophobic environment. Information concerning the disorderliness of conformation of substance P molecules in water, formation of an  $\alpha$ -spiral in methanol and acquisition of a supposedly  $\alpha$ -spiral structure by the peptide molecules in an aqueous solution in the presence of phospholipid micelles confirmed this assumption. Such interaction enabled the cell to "select" the hormone which evidently acquires a biologically active conformation in lipids for specific binding with the membrane receptor. There may be some selectivity of the plasmatic membrane in relation to the peptide bioregulator and an increase of the time of affect of the ligand on the cells. Figures 2; references 7: 3 Russian, 4 Western.

**Beta-Endorphin Level in Chronic Active Hepatitis Patients**

917C0509C Kiev VRACHEBNOYE DELO in Russian  
No 5, May 91 (manuscript received 20 Aug 90) pp 63-65

[Article by V. N. Khvorostinka, L. M. Pasiyeshvili, V. G. Teslenko, I. G. Dyakonova, and V. V. Byazrova, Department of Internal Diseases, Second Therapeutic Faculty, Kharkov Medical Institute]

UDC 616.36-002.2:612.015.3

[Abstract] The beta-endorphin level in plasma was investigated in 104 men aged 27 to 49 years who had suffered from chronic active hepatitis for a period of one to four years. The results demonstrated that the beta-endorphin level was 3-fold higher in the experimental group (31.17 pmol/l as opposed to 9.30 pmol/l for the control group) and even higher in patients that had had the disease for two or more years. Moreover, it was shown that the beta-endorphin level correlated directly to alkaline transferase and aminotransferase levels, and to a lesser degree to aldolase levels in the blood serum. It is believed that the higher beta-endorphin levels in the bloodstream are due to marked activity of the pathological process and the onset of hepatocytic insufficiency. In conclusion, it is hoped that further investigation of the functional status of opioid peptides in chronic liver diseases will help expand the concepts of their role in the pathogenesis of hepatobiliary system diseases. References 4: Russian.

**Human Adaptation to Moderate Altitude Hypoxia and Hyperthermia During Physical Effort**

917C0515A Moscow FIZIOLOGIYA CHELOVEKA  
in Russian Vol 17 No 2, Mar-Apr 91 (manuscript received 20 Nov 89) pp 118-124

[Article by Ye. A. Kushnirenko, E. Sokolowski, L. Tomaszewska, I. Laszczinska, D. Gembicka and W. Debinski, Military Institute of Aviation Medicine, Warsaw, Poland]

UDC 612.821

[Abstract] An assessment was conducted on human adaptation to high ambient temperature and to the combination of high temperature + moderate hypoxia while engaging in physical exertion. The studies involved a cohort of eight clinically healthy students, 20 to 24 years old, with an average height of 180.2 cm and a mean weight of 78.2 kg. A special 70 m<sup>3</sup> temperature-controlled pressure chamber was constructed, allowing studies under the following conditions: I) 115 m pressure above sea level, 23°C temperature, 50 percent relative humidity, II) 115 m, 40°C, and 55 percent rel. hum., III) 525 mm Hg (= 3000 m above sea level; pO<sub>2</sub> = 110.4 mm Hg), 22-23°C, and 50 percent rel. hum., and IV) 525 mm Hg, 40°C, and 53 percent rel. hum. After 15 min of adaptation in the chamber a 15 min workout on an exercise bicycle was started under a load equivalent to 60

percent of the maximum oxygen utilization. Monitoring of the heart rate, hemodynamic parameters, rectal and skin temperatures, and blood chemistries showed that best tolerance of physical effort prevailed in situation IV, whereas situation II was found to be the most stressful. In the later case the heart rate in some of the subjects reached 200-205 beats/min after 15 min of exercise. The fact that the combination of low atmospheric pressure and high temperature was better tolerated than high temperature alone was attributed to more efficient heat elimination via perspiration under hypobaric conditions. Figures 4; tables 1; references 19: 7 Russian, 5 Polish, 7 Western.

**Dedication of New Brain Research Center in Leningrad**

917C0515A Moscow FIZIOLOGIYA CHELOVEKA  
in Russian Vol 17 No 2, Mar-Apr 91 pp 156-158

[Article by V. M. Vladimirskaia]

[Abstract] December 4, 1990, marked the dedication of the new Applied Brain Research Center in Leningrad, which was attended by leading brain researchers from the USSR and abroad. S. V. Medvedev, director of the center, stated that the center includes a Human Brain Institute, a 160 bed hospital and, in the near future, will be complemented with a 300 bed neurological rehabilitation clinic. The major objectives of the center are the diagnosis and treatment of CNS diseases in combination with basic and applied neurological research.

**Enhancement of Animal Endurance by Para-Aminobenzoic Acid (PABA)**

917C0517A Moscow IZVESTIYA AKADEMII NAUK  
SSSR: SERIYA BIOLOGICHESKAYA in Russian  
No 2, Mar-Apr 91 (manuscript received 12 Sep 89)  
pp 224-231

[Article by N. I. Arlashchenko, D. Ya. Oparina and I. A. Rapoport, Institute of Biomedical Problems, USSR Ministry of Health, Moscow]

UDC 591.1

[Abstract] Trials were conducted with PABA as a general innocuous stimulant to assess its efficacy in animals subjected to ionizing radiation. The experimental design relied on swimming tests to analyze the effects of intraperitoneal administration of PABA (25 mg/kg; three injections at 10 day intervals) to male Wistar rats and (CBA x C57Bl)F<sub>1</sub> mice, followed by 8 Gy gamma irradiation 10 days after the last injection. In terms of swimming endurance the PABA-treated animals performed on par or better than the unirradiated controls, and exceeded the endurance of unprotected irradiated animals by 60 percent. In terms of speed of swimming the PABA-treated irradiated group exceeded 1.5-fold the control group and 2-fold the performance of irradiated but PABA-untreated animals. In addition, with both



species PABA improved the 30 day survival figures by an average of 20 percent. These findings, then, confirmed previous reports on stimulant properties of PABA and extended the body of knowledge to animals affected by ionizing radiation. Figures 3; tables 2; references 14: Russian.

**In Vitro Fibrinolytic and In Vivo Anticoagulant Actions of Tuftsin**

917C0517B Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA BIOLOGOGICHESKAYA in Russian No 2, Mar-Apr 91 (manuscript received 30 Mar 90) pp 302-306

[Article by I. P. Ashmarin, V. Ye. Pastorova, L. A. Lyapina, B. A. Kudryashov, V. N. Kalikhevich, A. A. Kamenskiy and L. D. Aziyeva, Biological Faculty, Moscow State University]

UDC 612.11/.12:612.115.1

[Abstract] In vitro studies demonstrated that tuftsin (0.1 mg/ml) prolonged the recalcification time of rat sera by 125 percent and, in concentrations of  $10E-9$  to  $10E-1$  mg/ml, promoted fibrin depolymerization in a dose-dependent fashion. In addition, intravenous administration of 0.3 and 1 mg/kg of tuftsin to 170-180 g outbred male rats significantly prolonged recalcification and prothrombin times for ca. 120 min. Accordingly, in addition to its efficacy as an immunostimulant, tuftsin has been demonstrated to possess in vivo and in vitro anticoagulant and fibrinolytic properties. Figures 2; tables 1; references 11: 9 Russian, 2 Western.

**Effects of Cucumarioside on Liver Regeneration**

917C0517C Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA BIOLOGOGICHESKAYA in Russian No 2, Mar-Apr 91 (manuscript received 20 Mar 90) pp 306-310

[Article by S. N. Turishchev, G. B. Bolshakova and O. G. Sakandelidze, Scientific Research Laboratory of Biologically Active Substances of Hydrobionts, USSR Ministry of Health, Moscow]

UDC 591.1

[Abstract] A hepatectomy model was used in assessing the effects of cucumarioside, a triterpene glycoside complex derived from *Cucumaria japonica*, on cellular proliferation. The experimental model involved 250-300 g male Wistar rats subjected to two-thirds hepatectomy and then treated intraperitoneally with 0.05  $\mu$ g/kg of cucumarioside. Histologic monitoring of hepatic regeneration for the subsequent 192 h showed that in cucumarioside-treated animals the mitotic index was depressed at 28 and 32 h in comparison with hepatectomized but untreated animals, followed by rebound peaks at 40 and 44 h in the cucumarioside group but not in the untreated group. The occurrence of the mitotic peaks at

40 and 44 h was attributed to activation of endogenous factors that served as antagonists to cucumarioside. Figures 2; tables 1; references 11: 7 Russian, 4 Western.

**Role of Opiate Mechanisms of the Hippocampus and Substantia Nigra in Behavioral and Convulsive Disorders in Picrotoxin Kindling**

917C0556A Moscow BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY in Russian Vol 111 No 3, Mar 91 pp 235-239

[Article by G. N. Kryzhanovskiy, A. A. Shandra, L. S. Godlevskiy, A. M. Mazarati, Nguyen Tkhi Tkhan, Chair of Normal Physiology, Odessa Medical Institute imeni N. I. Pirogov; Laboratory of General Pathology of the Nervous System, Scientific Research Institute of General Pathology and Pathological Physiology, USSR Academy of Medical Sciences, Moscow]

UDC 616.853-092:616.831.314]-07

[Abstract] Opiatergic mechanisms of the reticular portion of the substantia nigra are known to play an important role in the appearance and cessation of epileptic activity associated with certain kinds of kindling, including the repeated injection of picrotoxin, but the role of the different subtypes of opiate receptors in kindling mechanisms remains unclear. Recent suggestions that the  $\mu$ - and  $\kappa$ -opiate systems are important components in that process prompted the researchers here to study the alterations of behavioral and convulsive reactions by injecting the rat hippocampus and the substantia nigra with met-enkephalin and dinorphin-A-1-13. The test animals were male Wistar rats (250-300 g) subjected to pharmaceutical kindling that involved daily intraperitoneal injections of picrotoxin in doses that were initially subconvulsive (1 mg/kg). One to five days after the kindling began, the rats were injected bilaterally with one of the two agonists (in doses of 1 and 10  $\mu$ g) in either the hippocampus (AP = -4.8, L = 4.5, H = 7.0) or the substantia nigra (AP = 4.8, L = 2.5, H = 8.0). A testing injection of picrotoxin followed 20-30 min later. Test results indicated that the met-enkephalin injection into the hippocampus led to elevated intensity of convulsive reactions caused by the convulsant; dinorphin injected into the substantia nigra had an anticonvulsive effect. Some of the animals were observed to exhibit explosive behavior after their convulsive seizures, and it was established that the causative factor was the met-enkephalin, which led the researchers to conclude that the explosiveness was due to the continued high level of activity of the  $\mu$ -opiate system of the hippocampus after the initiation of the clonic-tonic seizures. The researchers also concluded that activation of the  $\mu$ -opiate system is one mechanism underlying the production of a pathologically enhanced excitation generator in the hippocampus. Similarly, the  $\kappa$ -opiate system of the substantia nigra plays a critical part in



quelling seizures and in the development of a post-seizure depression. Figures 2; references 18: 7 Russian, 11 Western.

# **Effect of Taurin on the Density of Adrenergic Nerve Endings and Restoration of Heart Functions After Ischemia**

917C0556B Moscow BYULLETen  
EKSPERIMENTALNOY BIOLOGII I MEDITSINY  
in Russian Vol 111 No 3, Mar 91 pp 241-244

[Article by T. M. Pukhova, N. I. Zhukova, Laboratory of Physiology of the Myocardium, Institute of Experimental Cardiology; Laboratory of Neurohistology and Histochemistry, Department of Cardiovascular Human Pathology, All-Union Cardiology Science Center, USSR Academy of Medical Sciences, Moscow]

UDC 616.12-005.4-07:616.12-008.3-02:615.22

[Abstract] Myocardial ischemia is accompanied by the efflux of potassium ions from myocardial cells and their accumulation in the intracellular space, as well as by the ejection of catecholamines from nerve endings—all factors that are key to the genesis of reperfusion arrhythmias and affect the restoration of the contractile function of the heart in reperfusion. That, plus the fact that taurin has inotropic and antiarrhythmic effects and has been shown to reduce the potassium-induced release of catecholamines from sympathetic granules of the adrenal glands and the brain, was the starting point for the researchers here, who studied the effect of taurin on the restoration of heart contractile function and automatism and on the density of adrenergic nerve endings after ischemia. Isolated guinea pig hearts were perfused with Krebs-Henseleit buffer through a canula placed in the aorta. A small liquid-filled balloon was inserted in the cavity of the left ventricle, and balloon pressure, reflecting the tension of the ventricular fibers, was measured with an electromanometer. The baseline data for function of the isovolumic hearts at the beginning of the experiments (developing pressure, diastolic pressure, and heart rate) were virtually identical in all the series of experiments. Results of the research indicated that when taurin was added in the period of reperfusion only, no fibrillation was noted. Although restoration of the contractile function was identical in all series, the restoration of normal automatism was considerably faster in the experiments in which the taurin was added at the beginning of reperfusion. The density of adrenergic plexi nervosus in the ischemic hearts was 4-fold and 6-fold lower than in hearts taken out of the animals immediately in the right and left ventricles, respectively. With the use of taurin only after ischemia, the density in both ventricles was approximately 2.7-fold higher than without the addition of taurin. The results indicate that raising the concentration of taurin in the perfusate

before ischemia helps considerably to keep catecholamines in the myocardium, which can be useful in producing a more rapid restoration of the functional status of the heart after operations. Figures 1; references 7: 3 Russian, 4 Western.

# **The Effect of Arginine-Vasopressin on Excitability and Fatty Acid Content of Rat Brain Structures in Neurosis**

917C0556E Moscow BYULLETen  
EKSPERIMENTALNOY BIOLOGII I MEDITSINY  
in Russian Vol 111 No 3, Mar 91 pp 271-274

[Article by P. A. Nerush, Chair of Pharmacology, Dnepropetrovsk Medical Institute]

UDC  
615.214-02:612.821.33+612.397.231:612.82:616.85-009.86

[Abstract] In studying the effect of arginine vasopressin on the excitability of certain structure of the limbic-reticular complex and the frontal region of the neocortex, the researchers used 15 male rats (230-250 g) with bipolar electrodes implanted in the frontal cortex (A-2, D-2, H-0.5), the dorsal region of the hippocampus (P-2, D-1, H-3.5), and the reticular formation of the midbrain (P-6.5, D-2, H-7). They determined the threshold of excitability to be approximately 12-13 V for the frontal cortex, 6-7 V for the hippocampus, and 4-5 V for the midbrain. Neurosis was accompanied by elevated excitability, which almost doubled for the hippocampus and was 3- to 4-fold higher for the midbrain. Free fatty acid content in the neurotic state was determined quantitatively in the cerebral cortex, the hippocampus, and the midbrain in 29 white male outbred rats (180-200 g) with gas chromatography. The fatty-acid spectrum of lipids demonstrated elevated levels of linoleic acid, with varying changes in the arachidonic acid levels in the cerebral cortex and subcortical structures. The midbrain exhibited reduced levels of myristic acid and stearic acid. In general, the changes produced by the arginine vasopressin differed from those observed in neurosis unrelated to argipressin, i.e., elevated arachidonic acid in the hippocampus and midbrain (2.5- to 6-fold higher) as well as in the cerebral cortex (higher by 66 percent). Levels of myristic, palmitic, stearic, and oleic acids were also higher. References 15: 11 Russian, 4 Western.

# **Action of Befol and Its Derivatives on Monoaminoxidase of Varying Origin**

917C0556F Moscow BYULLETen  
EKSPERIMENTALNOY BIOLOGII I MEDITSINY  
in Russian Vol 111 No 3, Mar 91 pp 279-280

[Article by O. A. Goldina, T. A. Moskvitina, Ye. M. Gankina, A. Z. Kinkel, N. S. Kamyshanskaya, K. I. Lopatina, T. V. Sokolova, V. A. Zagorevskiy, A. V.

Valdman (deceased), V. Z. Gorkin, Institute of Biological and Medical Chemistry, USSR Academy of Medical Sciences; Institute of Pharmacology, USSR Academy of Medical Sciences, Moscow]

UDC 577.150.4.577.158.4

[Abstract] In studying the mechanism of action of a new antidepressant, befol p-chlor-N-(2-morpholinobutyl)benzamide, the researchers examined the antidepressant's effect on the MAO of tissue containing various different quantities of isoenzymes A and B. They also compared the anti-MAO activity of various benzamide derivatives that are similar to befol. The source of the MAO activity was a 50 percent homogenate of rat brain (prepared in a 0.01 M k-Na-phosphate buffer, pH 7.6), mitochondrial fractions of rat and bovine brain, placenta, and human thrombocytes. The researchers found that the serotonin-deaminase activity typical of MAO type A was inhibited by the befol. Inhibition of 2-phenylethylamine-deaminase activity typical of MAO B was less pronounced. The relationship of serotonin-deaminase activity inhibition and befol concentration was found to point to differences that exist in the sensitivity of MAO of various biological objects to befol's inhibiting action. Very sensitive to befol was rat brain MAO; placental MAO was not. Figures 1; references 14: 6 Russian, 8 Western.

#### **The Effect of Nerve Growth Factor on Cholinergic Neurons in Dissociated Cultures of Septum Pellucidum**

917C0556J Moscow BYULLETEN  
EKSPERIMENTALNOY BIOLOGII I MEDITSINY  
in Russian Vol 111 No 3, Mar 91 pp 305-306

[Article by N. K. Isayev, I. V. Viktorov, Brain Institute, USSR Academy of Medical Sciences]

UDC 612.826.1.014.2:612.6].063:612.818.018

[Abstract] Upon the introduction of nerve growth factor (NGF) into the cortex, NGF is known to be transported to cholinergic neurons of the basal nuclei of the fore-brain, affecting the viability of the neurons, as well as the level of activity of cholinacetyltransferase and acetylcholinesterase. In light of that, the researchers here studied the effect of NGF on size and number of cholinergic neurons in dissociated septum pellucidum cell cultures of embryonal Wistar rats that were 18 to 19 days old. In seven day cultures, neurons of varying color and with round, oval, or rod-like bodies were identified. The neurons had two to four processes, sometimes five, and they exhibited higher acetylcholinesterase activity than did control. The number of cells in cultures containing NGF was 46-105 percent greater than that in cultures without NGF. Figures 1; references 11: 2 Russian, 9 Western.

#### **Antiarrhythmic Sequelae of Adaptation to Hypoxia: Electrical Correlates**

917C0557A Moscow FIZIOLOGICHESKIY  
ZHURNAL SSSR IMENI I. M. SECHENOVA  
in Russian Vol 76 No 10, Oct 90 (manuscript received  
20 Dec 89) pp 1298-1303

[Article by F. Z. Meyerson and V. I. Vovk, Laboratory of Heart Pathophysiology, Scientific Research Institute of General Pathology and Pathologic Physiology, USSR Academy of Medical Sciences, Moscow]

UDC 612.172.2+612.273+577.4

[Abstract] The demonstration that adaptation to intermittent hypoxic episodes may provide protection against cardiac arrhythmia led to present studies with isolated heart muscles to elucidate the underlying physiological mechanisms. Accordingly, perfusion studies were conducted with papillary muscles isolated from 320-380 g male Wistar rats 'adapted' to hypoxia in a pressure chamber (day 1 6 h at 1000 m; day 2 6 h at 2000 m; days 3-40 6 h at 5000 m). Electrophysiological monitoring established that after 10 min of perfusion with low (18 mM) NaCl solution, intended to induce an intracellular calcium overload, muscles from control animals contracted by 13.1 percent and those from experimental animals by only 6.0 percent. Furthermore, myocardial cells from 'hypoxic' rats maintained a resting potential of -84.2 mV with 0.5 Hz stimulation, whereas control values were on the order of -77.0 mV. Combination of high frequency of stimulation (1 Hz) and high calcium in the perfusate (18 mM) induced resting potentials of experimental and control preparations of -86.1 and -74.3 mV, respectively ( $p < 0.05$ ). In addition, the papillary muscles of the 'adapted' rats retained a normal overshoot (23.9 mV) and amplitude (110 mV) of the action potentials, parameters which in control papillary muscles were significantly depressed (2.4 and 76.7 mV, respectively). Finally, the duration of the action potential with 50 and 90 percent repolarization was some 2.5-fold greater in 'adapted' muscles than in control muscles ( $p < 0.01$ ). Accordingly, these observations indicate that the antiarrhythmic effects of intermittent hypoxic episodes can be attributed to changes in the electrical properties of heart cells. Figures 2; tables 1; references 12: 4 Russian, 8 Western.

#### **Antioxidant Modulation of Thyroxine Effects on Rat Myocardium**

917C0557B Moscow FIZIOLOGICHESKIY  
ZHURNAL SSSR IMENI I. M. SECHENOVA  
in Russian Vol 76 No 10, Oct 90 (manuscript received  
20 Dec 89) pp 1312-1316

[Article by T. S. Balashova, N. K. Khitrov and A. M. Gerasimov, Chair of Pathophysiology, 1st State Medical Institute imeni I. M. Sechenov, Moscow]

UDC 612.172+612.44.018

[Abstract] The implication that lipid peroxidation may enter into the pathogenetic mechanism of myocardial damage in hyperthyroidism led to an assessment of the combination of exogenous antioxidants and thyroxine on the heart. The basic experimental model consisted of Fe-induced lipid peroxidation in the myocardium of 200 g outbred male rats treated for five days intraperitoneally with 2 mg/kg  $\alpha$ -thyroxine + 50 mg/kg of  $\alpha$ -tocopherol or with thyroxine + 200 mg/kg of reduced glutathione. In terms of malonic dialdehyde accumulation, thyroxine was seen to enhance the rate of lipid peroxidation 2.5-fold over control levels, while conjoint administration of  $\alpha$ -tocopherol limited the increase to 1.5-fold. Glutathione was entirely ineffective.  $\alpha$ -tocopherol was also observed to enhance myocardial tolerance of hypoxia and stabilize cardiac function in the face of challenge with exogenous norepinephrine or acetylcholine. Administration of glutathione actually potentiated the insult posed by hypoxic episodes and the administration of the catecholamine, presumably by enhancing binding of catecholamines to  $\beta$ -adrenoreceptors. Figures 1; tables 3; references 11: 8 Russian, 3 Western.

### Modulation of Gastrointestinal Slow Waves and Migrating Electric Complex

917C0557C Moscow FIZIOLOGICHESKIY  
ZHURNAL SSSR IMENI I. M. SECHENOVA  
in Russian Vol 76 No 10, Oct 90 (manuscript received  
11 Jan 90) pp 1440-1448

[Article by I. I. Busygina, N. I. Kortezova, V. A. Bagayev and M. P. Papazova, Laboratory of Corticovisceral Physiology, Institute of Physiology imeni I. P. Pavlov, USSR Academy of Sciences; Autonomic Regulation Section, Institute of Physiology, Bulgarian Academy of Sciences, Sofia]

UDC 612.327+577.15/.17

[Abstract] The identification of bombesin-like peptides in the amygdala provoked an assessment of the potential role of these peptides in modulation of gastrointestinal motor activity. Accordingly, 12-16 kg outbred dogs were utilized for central microinjection of 5  $\mu$ g of bombesin into the central nucleus of the amygdala and electrophysiological monitoring of the consequences. Within 5-10 min of injection slow waves in the pyloric region of the stomach decreased from 4-5.5 to 2-3 per min., with recovery of the baseline pattern after 30-60 min. Duodenal slow waves were not affected. In addition, a similar latent period preceded inhibition of spike potentials in the pylorus and the duodenum which persisted for 10-20 min. Thereafter gastric spikes showed full recovery, whereas in the duodenum only 30-50 percent recovery was observed. Administration of bombesin during a resting phase induced an increase in spike potentials in 5-10 min in the duodenum and the stomach and reduced the duration of the resting phase of the

migrating electrical complex. A day after bombesin administration irregular spike activity was noted in the stomach and the duodenum with virtual absence of resting phases. These findings point to a direct involvement of the amygdala in gastrointestinal motility, which presumably involves bulbar parasympathetic formations. The presence of well-defined latent periods suggests mediation by gastrointestinal peptides, of which motilin is the prime candidate. Tables 4; references 27: 9 Russian, 18 Western.

### S-100 Protein: Correlation With Memory

917C0561A Moscow ZHURNAL VYSSHEY  
NERVNOY DEYATELNOSTI IMENI I. P. PAVLOVA  
in Russian Vol 41 No 1, Jan-Feb 91 (manuscript  
received 1 Jun 89; in final form 21 Mar 90) pp 60-65

[Article by L. A. Gromov, L. P. Syrovatskaya and G. V. Ovinova, Kiev]

UDC 612.821.2+615.217.34

[Abstract] Outbred albino rats served as a model system for assessing the mnemonic effects of the neuropeptide S-100 in conditioned feed-procuring and withdrawal responses. The results showed that intraperitoneal administration of 40 mg/kg of atropine or of 0.1 ml intracisternally of anti-S-100 rabbit antiserum inhibited the passive avoidance response in 73-81 percent of the animals. Combined administration of atropine and the antiserum resulted in 100 percent inhibition for 24 h. The effects were most pronounced on immediate treatment after acquisition of a response, with only 40-60 percent inhibition if administration was delayed for 1 h. The concentration of S-100 in the cerebral gray matter was not affected to an appreciable extent, although a slight increase was detected in both cerebral hemispheres in rats with the acquired reflex. Intracisternal administration of S-100 (0.2  $\mu$ g/rat) 1 h after atropine administration did not reverse the effects of the latter. Atropine treatment immediately after acquisition of the food reflex resulted in 100 percent inhibition. Acquisition of the conditioned food response was accompanied by significant elevations in brain levels of endogenous S-100, a trend that was completely precluded by atropine. These findings indicate that S-100 plays a key role in memory processes. The fact that a rise in S-100 did not occur in the avoidance study may indicate that conformational changes in the S-100 protein were more important than concentration. Tables 3; references 20: 13 Russian, 7 Western.

### Effects of Penta Peptide on Conditioned Reflexes in Young Rats

917C0561B Moscow ZHURNAL VYSSHEY  
NERVNOY DEYATELNOSTI IMENI I. P. PAVLOVA  
in Russian Vol 41 No 1, Jan-Feb 91 (manuscript  
received 28 Dec 89; in final form 5 Jun 90) pp 66-72

[Article by L. A. Tsitolovskaya, N. A. Ryabchikova, L. P. Parfenova and G. I. Chipens, Chair of Physiology of

Higher Nervous Activity, Moscow State University; Institute of Organic Synthesis, Latvian SSR Academy of Sciences, Riga]

UDC 612.599.323.4+612.821.6+612.8.015

[Abstract] The implication that  $\alpha$ -interferon possesses psychotropic activity led to studies on the effect of the pentapeptide (PP) Tyr-Phe-Arg-Lys-Asp on flexibility of conditioned responses. The selection of PP was based on the fact that it represents a combination of the strongly polar C-terminus of  $\alpha$ -interferon with the hydrophobic apolar Tyr-Phe dipeptide which ensures interaction with cell membranes. The model system employed outbred albino rats (15 to 17 days old at the start and 1.5 months at the conclusion) and acquisition of a conditioned feed-procuring response with one conditioned stimulus (noise) and subsequent switch to another (light). After acquisition of the initial conditioned response the animals were treated intramuscularly with 80  $\mu$ g/kg of PP 30 min before training with the new conditioned stimulus commenced. The results showed that untreated control animals developed responsiveness to the second stimulus after 15 trials, an acquisition that persisted over a two week break period. The experimental rats, however, failed to acquire double responsiveness after 30 trials. The latter responded either to one or the other stimulus, but not to both. These findings indicate that PP interferes with processing of disparate stimuli into a single response, a process that may rely on second messenger systems. Figures 4; references 14: 6 Russian, 8 Western.

**Synaptic Transmission and Excitability of Command Neurons Involved in Defensive Behavior of Helix Lucorum: Modulation by Small Cardioactive Peptide (b) (SCPb)**

917C0561C Moscow ZHURNAL VYSSHEY NERVENNOY DEYATELNOSTI IMENI I. P. PAVLOVA in Russian Vol 41 No 1, Jan-Feb 91 (manuscript received 16 Mar 90; in final form 10 May 90) pp 107-112

[Article by N. I. Bravarenko, Institute of Higher Nervous Activity and Neurophysiology, USSR Academy of Sciences, Moscow]

UDC 612.821.6+612.822.3+612.8.015

[Abstract] Perfusion studies were conducted with isolated CNS of the snail *Helix lucorum* to assess the neurotropic effects of SCPb at the electrophysiological level. The results showed that in a concentration of  $5 \times 10^{-8}$  M SCPb increased by 55 percent the amplitude of the postsynaptic potentials and by 92 percent the excitability of the 'command' neurons in the withdrawal reflex elicited by electrical stimulation of the intestinal

nerve. These observations suggest that SCPb may attenuate the responsiveness of the neuronal network responsible for the withdrawal response by altering the efficiency of synaptic transmission between sensory and motor neurons in this reflex arc. Consequently, in addition to its cardiotropic effects and action on the digestive apparatus, SCPb also appears to act on neurons involved in withdrawal mechanisms in gastropods. Figures 4; references 15: 5 Russian, 10 Western.

**Enhancement of Stress Tolerance by D-Phenylalanine**

917C0561D Moscow ZHURNAL VYSSHEY NERVENNOY DEYATELNOSTI IMENI I. P. PAVLOVA in Russian Vol 41 No 1, Jan-Feb 91 (manuscript received 6 Jul 89; in final form 13 Sep 89) pp 156-161

[Article by Ye. A. Yumatov, Ye. I. Sarychev, I. I. Kozlovskiy, M. F. Mineyeva, V. M. Demidov, I. S. Morozov and M. M. Kozlovskaya, Institutes of Pharmacology and of Normal Physiology imeni P. K. Anokhin, USSR Academy of Medical Sciences, Moscow]

UDC 612.821.6+615.78+612.821.1

[Abstract] D-Phenylalanine (DPA) was tested for its effects on immobilization-stressed rats in view of its inhibition of enzymes responsible for degradation of endogenous enkephalins. The fundamental approach involved per os administration of 150-300 mg/kg of DPA for seven days to 180-200 g male August rats prior to stress (30 h continuous immobilization or 12 h/day for seven or 14 days). Graphical data showed that DPA treatment reduced mortality ca. 2- to 6-fold and pathologic monitoring revealed marked alleviation of pulmonary and gastric mucosal pathology. In addition, studies on the hypothalamus revealed that tyrosine hydroxylase activity (TH) was 2-fold lower in DPA-treated rats than in stressed untreated rats. Accordingly, the beneficial effects of DPA pretreatment appear to involve two mechanisms of action: preservation of endogenous opioids via inhibition of enkephalinase and interference with catecholaminergic mechanisms via inhibition of TH. Figures 3; references 12: 9 Russian, 3 Western.

**Phosphorylation of Synaptic Membrane Proteins in Carbachol-Induced Mnemic Dissociation**

917C0561E Moscow ZHURNAL VYSSHEY NERVENNOY DEYATELNOSTI IMENI I. P. PAVLOVA in Russian Vol 41 No 1, Jan-Feb 91 (manuscript received 26 Feb 90; in final form 10 May 90) pp 162-167

[Article by V. I. Arkhipov and T. G. Shchipakina, Institute of Biological Physics, USSR Academy of Sciences, Pushchino]

UDC 612.833+577.35.334+612.821.6

[Abstract] An analysis as conducted on the mechanisms of action involved in prolonged mnemonic dissociation induced by carbachol by assessment of the rates of phosphorylation of synaptic membranes in the hippocampus and neocortex of Wistar rats. The studies were conducted with rats with a well-developed feed-procuring response treated with 40 µg/rat of carbachol into a lateral ventricle of the brain after five days of training. Carbachol treatment resulted in nonperformance for four days, and was accompanied by marked enhancement of hippocampal phosphorylation which

peaked two days after carbachol administration. Phosphorylation encompassed the entire protein spectrum (ca. 20 to 60 kD). Neocortical changes were marked by a less pronounced overall increase in protein phosphorylation and included diminished phosphorylation of ca. 50 kD proteins and enhanced phosphorylation of < 20 kD fraction. After four days the levels of phosphorylation reassumed baseline patterns in tandem with recovery of the procuring response. These observations implicate hippocampal mechanisms in the phenomenon of cholinergic mnemonic dissociation. Figures 4; references 13: 7 Russian, 6 Western.



## New Payment System Seen as Threat to Rural Hospitals

917C0430A Kiev PRAVDA UKRAINY in Russian  
13 Mar 91 p 3

[Article by Tamara Odínokova: "A Question From the Heartland: Farewell to Rural Hospitals?"; first two paragraphs are PRAVDA UKRAINY Introduction]

[Text] "In a discussion of the plan for social and economic development and budget for our rayon for 1991, I learned from the chief physician of the rayon hospital that medical institutions are switching to a new form of payment of wages on 1 January. And if, for example, a rural resident has undergone a course of treatment at an oblast or republic-level medical institution, that institution submits a bill to the rayon or community hospital."

V. Snegirev, chairman of the ispolkom [executive committee] of the community council of people's deputies of Lugansk Oblast, continues in a letter to us: "In the opinion of upper level medical management, such a step should compel the medical personnel of each hospital and polyclinic to 'fight' for its patients and improve medical care. However, this could lead to some adverse phenomena, in particular, to a reduction in number or total folding of the network of rural hospitals."

What is the basis of the chairman's conclusions? For the last two to three decades there was intensive development of centralization of medical care. New hospitals were built in oblast centers (though not without difficulties) and modern equipment was purchased. Though it was slow, there was progress in providing housing for medical personnel. Of course, qualified medical personnel were attracted to oblast centers (more than 10 qualified specialists have left the Belolutsk Community Hospital alone). At present, the situation is growing more acute: People will go for treatment where there are modern equipment and more physicians, where there are high-grade consultants. Consequently, that is where money will shift.

What does this mean—a farewell to rural hospitals? Why not ask rural residents, particularly the elderly, whether this is what they want. Do they want to lie in a hospital far from home? Believe me, they would not. This means that the rural citizens (one could not make State institutions and enterprises do it) would have to "drop out" and build hospitals at their own expense. But how could one attract high-class specialists to go there?

And why should this problem lie on the shoulders of the villagers whose job is to feed cities. And is this how we are to interpret the decree pertaining to priority of rural areas, is this the way to give them their due, asks the ispolkom chairman.

We took this letter to A. P. Kartysh, chief of the Main Medical Administration of the Ukrainian Ministry of Health.

[Odínokova] Are not the fears of Anatoliy Petrovich, chairman of the community soviet, groundless?

[Kartysh] Remember how a poet wrote "rumors spread, divulging truth and fable." And the same applies to this. Either the writer of this letter misunderstood something, or else the chief physician confused something.

[Odínokova] But, after all, there's never any smoke without a fire....

[Kartysh] Of course there is! But I can guess at the source of the alarm: This year, medical institutions of Kiev (but not in Lugansk Oblast) switched to their own cost accounting. This is an experiment.

[Odínokova] Last year, they wrote about such an experiment in Leningrad.

[Kartysh] In Leningrad, and in Kuybyshev and Kemerovo oblasts. We were not the first.

[Odínokova] Cost accounting in medicine. Somehow that is difficult to grasp. We have become used to the fact that human health in our country is the concern of the government, our medicine is free and this is a social conquest of socialism. But we hear increasingly often that payment will have to be made for medical services. Perhaps paid services are attributable to the cost accounting system itself?

[Kartysh] No such thing. Cost accounting is our internal affair. The absence of cost, availability to all and preventive orientation will remain as firm principles.

[Odínokova] But at present various medical cooperatives are cropping up, and paid examinations are performed.

[Kartysh] So what? This is a matter of freedom of choice.

[Odínokova] What then is the substance of internal cost accounting in health care?

[Kartysh] In the first place, we have the territorial principle of managing this sector, that is, financing is based on number of residents in an area. Let us assume that there are 2 million people in an oblast, and the standard rate of 80 rubles is set per person. This means that 160 million rubles will be allocated to the oblast. In the second place, funds will be held by medical associations. They will determine on their own the structure and priorities in organizing medical care.

[Odínokova] Do the associations cover all medical institutions in an area?

[Kartysh] Yes, polyclinics, hospitals, diagnostic centers, first aid stations.... And most of the funds are allocated for outpatient polyclinic care. But the main responsibility for the patient's health is also placed upon polyclinics. Qualitative indicators are the cornerstone: reduction of morbidity, disability, efficacy of the treatment



process. After all, should a person be hospitalized for diagnostic purposes? Only treatment should be administered in a hospital.

[Odinokova] Of course, it's fine if matters do not reach the hospital stage. But in any case one cannot do without hospitals.

[Kartysh] Of course. But, according to cost-accounting conditions, if an individual does get into a hospital, his treatment there is paid for by the polyclinic. So that the polyclinic department personnel have to fight as hard as they can for the health of a person, and they must work on real prevention.

[Odinokova] And how will wages be paid?

[Kartysh] There is a wage fund. Salaries are not restricted within its limits. But a physician will be paid for the end results of his work, and not on the basis of his position, or the fact that he "marks time" and has worked for some period of time.

[Odinokova] Does the government remain as the source of financing, like before?

[Kartysh] Yes. But economic management methods make it possible to find additional finances.

[Odinokova] For example?

[Kartysh] Any medical institution has the right to make contractual agreements to render additional medical care to employees of enterprises, state and collective farms. Of course, the cost of treatment at the standard rates is paid from the enterprises' social development or profit funds. Agencies have been guilty of overt wastefulness with respect to human health in their race for an immediate interest (a plan, additional profit, etc.), whereas health care institutions have to bear the responsibility virtually by themselves for such wastefulness.

And another thing: joint-stock companies, charitable funds and personal voluntary contributions may be among the sources of income on all levels.

[Odinokova] But let us return to the letter of V. Snegirev, chairman of the Belolutsk community council. Will intra-agency cost-accounting affect the activities of community and rural hospitals?

[Kartysh] I am sure that in villages too it is necessary to strengthen the walk-in offices and obstetric-feldsher centers. You must agree that it is hardly reasonable to invest the same funds in equipment for a rural hospital as for the equipment of a rayon or oblast hospital. Moreover, we could not manage it. And it is not worthwhile for farms to "drop out." It is a different matter to combine funds and build sanatorium-preventoriums, strengthen obstetric-feldsher centers and help with transport for the walk-in offices.

[Odinokova] Thus, the republic's Ministry of Health stands for a realistic approach to the problem.

[Kartysh] Exactly. Incidentally, the same things are being done in countries where the situation with health care is much better than ours.

### **Blood Donations Down, Commercialization Considered**

917C0433A Tallinn VECHERNIY TALLINN  
in Russian 9 Feb 91 p 3

[Article "Urban Miscellany"]

[Text] There has been a decline in the blood donor movement. The number of donors has diminished, even in comparison to last year. At the same time, there are citizens who donate blood several times a year. These people merit our special gratitude. This and many other matters were discussed at a joint meeting of the gor-ispolkom [executive committee of city soviet of workers' deputies], attended by physicians, representatives of the Red Cross Society and Republic Blood Bank Center.

There was particular discussion of publicity about blood donations in the mass media. In this respect, radio and the press are very helpful, but there could also be much more coverage on television.

The talk about possible commercialization of blood donations in the future turned into a debate. After all, in the West there are commercial blood banks, in addition to those sponsored by the Red Cross.

### **Health of One-Year-Old Children and Health Monitoring in Rural Areas**

917C0520A Alma-Ata ZDRAVOOKHRANENIYE  
KAZAKHSTANA in Russian No 3, Mar 91 pp 11-13

[Article by A. K. Mashkeyev, Sh. I. Khusainova, M. A. Akhmetova, S. A. Gagarina, K. Kh. Zhunusova and Z. M. Mukhamedzhanova, Kazakh Scientific Research Institute of Pediatrics, Alma-ata]

UDC 616-053.36-084

[Abstract] Health monitoring at a farm in the Kurtinskiy Rayon, Alma-Ata Oblast, encompassed 123 children during the first year of life and revealed that in the case of 81.3 percent more health risk factors were present at birth. Complications of pregnancy were noted in 30 percent of the cases and 31.7 percent of the risk factors were attributable to poor medical services and practices. Clinical findings were consistent with exudative diathesis in 19.7 percent of the children, anemia in 17.1 percent, rickets in 14.2 percent, physical underdevelopment in 3.6 percent and neuropsychiatric deficits in 7.4 percent. Improvements in local health services, including home visits by medical personnel and education of parents, reduced infant mortality by 50 percent in 1989. However, further improvements will require a greater commitment on the part of government authorities.

**Incidence of Hypertension Among Students**

917C0520B Alma-Ata ZDRAVOOKHRANENIYE  
KAZAKHSTANA in Russian No 3, Mar 91 pp 13-15

[Article by T. Z. Seysembekov, N. S. Umbetalina and D. Zh. Tayzhanova, No 2 Chair of Propaedeutics of Internal Diseases, Karaganda Medical Institute]

UDC 616.12-008.331.1-057.875(574.31)

[Abstract] Blood pressure monitoring of 4,011 16 to 25 year old students in Karaganda revealed an incidence of hypertension of 8.5 percent (9 percent men, 6 percent women). Assessment of risk factors showed that smoking was implicated in 18 percent of the cases, obesity in 4.3 percent and inadequate physical activity in 67.8 percent. These observations indicate the need for close health monitoring of students and more effective dissemination of information on health risk factors and intensified health education. References 2: Russian.

**Advances in Treatment of Alcoholism and Drug Abuse**

917C0520E Alma-Ata ZDRAVOOKHRANENIYE  
KAZAKHSTANA in Russian No 3, Mar 91 pp 69-72

[Article by A. Izmalkov, Kazakh SSR Ministry of Health]

UDC 616.89-008.[441.13+616.89-008.441.33]-084

[Abstract] A brief review is presented of the management of alcoholism and drug abuse with particular reference to the approaches at the City Drug Rehabilitation Hospital in Alma-Ata. The fundamental approach rests on combination of medical management in combination with psychotherapy and social support to enhance self-esteem. The hospital has a capacity of 510 beds and a polyclinic that accommodates 200 ambulatory visits per day. Self-admissions have increased to 10.6 percent of the total patient load this year in comparison with 5 percent in 1989, in itself a testimonial to the efficacy of treatment and educational measures. The remission rate in the case of alcoholics at the hospital is currently on the order of 34 percent, exceeding the 27-28 percent average for the USSR. In addition, support services at the hospital are also provided for 1,826 occasional drinkers or drug abusers. Despite the progress that has been made in the treatment and prevention of alcoholism and drug abuse in Alma-Ata, the inescapable conclusion is that much more could be accomplished with better support from the local authorities and improved facilities.

**Prophylactic Efficacy of Bemityl on Long Sea Trips**

917C0524A Moscow GIGIYENA I SANITARIYA in  
Russian No 3, Mar 91 (manuscript received 3 Aug 89)  
pp 37-39

[Article by V. S. Novikov, V. N. Bortnovskiy and I. A. Shamarin, Military Medical Academy imeni S. M. Kirov, Leningrad]

UDC 616-057:656.612]-092:612.017.1]-  
085.275.4-039.71

[Abstract] Prophylactic trials were conducted with bemityl to assess its efficacy in long sea trips in enhancing immunity and performance and in limiting general morbidity. Administration of bemityl (0.25-0.5 g/day; 14 days) to an experimental group of 148 19 to 38 year old sailors one month after a trip started resulted in a 40 percent increase in phagocytosis and an 18 percent increase in intraphagocyte digestion. An untreated group of sailors had moderate depression of phagocytosis. The bactericidal activity of the skin of the experimental group increased 18.9 percent and microbial colonization fell by 41 percent ( $p < 0.01$ ). In addition, the overall morbidity in the experimental group was 18.3 percent versus 81.7 percent in the control group, and their performance on sensorimotor tests was shown to be superior to untreated sailors. Side effects of bemityl consisted of allergy (2 percent), loss of appetite (2.7 percent), and nausea (0.7 percent). On balance, however, bemityl has been shown to be a promising agent in alleviating the adverse effects of prolonged sea trips. Tables 2; references 13: Russian.

**Validation and Implementation of Comprehensive Mother and Child Health Services in Tver Oblast**

917C0558A Moscow ZDRAVOOKHRANENIYE  
ROSSIYSKOY FEDERATSII in Russian No 1, Jan 91  
(manuscript received 3 Apr 90) pp 3-6

[Article by A. F. Vinogradov, V. L. Krasnenkov and L. K. Samoshkina, Tver Medical Institute; Tver Oblast Department of Health]

UDC 364.444:[364.65-055.26+364.65-053.2](470.331)

[Abstract] More than 70 key factors responsible for child mortality in Tver Oblast were analyzed for the period 1981-1983 in order to validate comprehensive maternal and child health care in the oblast. Evaluation of controlled and uncontrolled factors involved in the death of 7-day-old to one-year-old children showed that obstetrical complications accounted for 7.1 percent of the overall urban and 12.4 percent of the rural mortality. Preterm infants accounted for ca. 5 percent of mortality. Maternal lifestyle was the primary nonmedical factor and was identified as the causative factor in 14.7 percent of urban and 29.0 percent of rural mortality. The comprehensive health program in the oblast is designed

to eliminate such controllable factors as significant contributors to infant mortality and, accordingly, consists of a combination of medical and social measures. The health program has been designed to encompass three phases, with the first (1989-1990) represented by initial implementation, the second (1991-1995) by attainment of maximum improvement, and the third (1996-2010) by reduction of mortality statistics comparable with the European mean. The initial results are encouraging, as the mortality figures for children in the first year of life has already fallen from 20.6 per 1000 in 1988 to 17.7 in 1989. References 5: 4 Russian, 1 Western.

**Assessment of Efficacy of 'Zdorov'ye' Comprehensive Health Program by Novosibirsk Oblast Leadership**

917C0558B Moscow ZDRAVOOKHRANENIYE  
ROSSIYSKOY FEDERATSII in Russian No 1, Jan 91  
(manuscript received 27 Dec 89) pp 8-9

[Article by Ye. K. Ladygina and A. I. Babenko, Laboratory of Preventive Medicine Problems of Novosibirsk Oblast, Siberian Department, USSR Academy of Medical Sciences, Novosibirsk]

UDC 614.2(470)

[Abstract] A questionnaire survey has been conducted among government, educational, industrial and party administrators at a rayon in the Novosibirsk Oblast to assess their impressions of the success and impact of the 'Zdorov'ye' comprehensive health program in the oblast. A survey of 105 administrators showed that 81 percent felt that the health status of the oblast was unsatisfactory and required immediate remediation. But while 14 percent indicated that these problems were as important as other issues currently affecting society, 5 percent indicated that the health needs in the oblast were of secondary importance to more acute problems. The results also revealed that 70 percent of those questioned felt that their professional activities have an impact on health in the oblast even though their sphere of activities may be actually far removed from direct medical problems. Furthermore, 4 percent indicated that they were satisfied with the manner in which their agencies addressed health problems, 36 percent were unsatisfied, and 60 percent were ambivalent. Finally, 73.3 percent felt that inadequate material resources were the primary cause of poor health care, 40.9 percent attributed such problems to indifference on the part of the population, 30.4 percent attributed the problems to inadequate health regulations, and 27.6 percent to problems with the local government. The predominant feelings were that improvements in health information and education and in the quality of medical care should be the primary approach in enhancing health awareness in the oblast, followed by promulgation of progressive health regulations. In general, the overall impression was that the poor performance of the public health sector in the Novosibirsk Oblast is primarily due to poor civil administration.

**Reorganization of RSFSR Emergency Service**

917C0559A Moscow ZDRAVOOKHRANENIYE  
ROSSIYSKOY FEDERATSII in Russian No 1, Jan 91  
pp 30-31

[Article by L. Yu. Pavlova, Secretary of the Board of the RSFSR Ministry of Health, under the rubric "Information": "At the Board of the RSFSR Ministry of Health"]

UDC 616-082(470)

[Text] At its regular meeting in October 1990, the board of the RSFSR Ministry of Health examined the question of the organization of the operations of departments of urgent and planned consultation assistance (UPCA) of the republic (or ASSR), kray, and oblast hospitals and outlines measures for its further improvement.

It was noted that in the RSFSR, there are 100 such departments for providing UPCA to the population in republic, kray, oblast, or district hospitals. The consultation is given by specialists from medical and scientific research institutes and treatment facilities; team operations are being introduced; and there is long-distance consultation. Remote automated diagnosis of acute diseases has been implemented in 17 administrative territories. The medical aviation service has 189 aircraft (airplanes and helicopters). Assistance is given to more than 200,000 patients every year.

But as a study of the operations of the UPCA departments has shown, not enough attention is paid to the growth of the medical aviation service, and its resources are often used inefficiently, without regard for the material expenses for its maintenance.

In most of the administrative territories (the Tyumen, Tomsk, Kaluga, and Voronezh oblasts and the Yakut ASSR and Buryat ASSR, etc.), the UPCA departments are located on premises that do not meet health codes, which precludes work at a state-of-the-art level. There are no communications between the dispatcher service and the ambulances in the Yakut ASSR, Buryat ASSR, or the Vladimir or Tomsk oblasts. In many territories, there are no tape recorders for monitoring calls from the rayons (the Tyumen, Moscow, Tomsk, Vladimir oblasts, among others). Despite the variable telephone communications for transmitting calls, teletypes are underused. There are no automated systems for diagnosis of emergency conditions even in territories where weather conditions make the performance of health services difficult (Yakut ASSR, Buryat ASSR, and the Tomsk and Tyumen oblasts). There are no resuscitation vehicles in the medical aviation service of, for example, the Voronezh and Yaroslavl oblasts or Komi ASSR.

At the meeting, attention was turned to the poor recording-reporting documentation used by the departments

and the low level of information that documentation conveys. In many cases, data for consultation done by specialists of the republic, kray, and oblast hospitals on a planned basis is entered on UPCA department recording forms, which distorts statistical reporting.

As a rule, the quality of the care rendered on the spot by UPCA department specialists who go out on calls is not studied, and measures are not developed to eliminate existing flaws in that care. At the same time, with that kind of system in existence, more than half the calls for the UPCA department are of a critical nature. In terms of the assistance given by specialists of medical aviation, 8.5 percent involve surgeries or surgical interventions for emergency indications, and the number of such instances grew to 19,700 from 18,429 between 1986 and 1989. That points to the inadequate skill levels of physicians at treatment-and-prevention facilities in the rayons and to their inability to predict the course of an illness and bring in skilled specialists in a timely fashion.

It was noted that rarely does anyone evaluate the effectiveness of the work done by specialists called in to advise patients and rarely does anyone monitor whether the patients follow the recommendations made by the specialists. At the same time, service checks show that there are cases in which consultants who have no special training are used for advice and assistance. It is not rare for specialists who have little experience and are unskilled in terms of obstetrics-gynecological patients or very young children to be sent to give anesthesiological assistance or intensive care to such individuals, which results in diagnostic, tactical, and treatment mistakes.

In order to improve the organization of the medical aviation service and raise its quality, the board ordered health care organ officials to restructure the operations of the UPCA departments of the republic, kray, and oblast hospitals by creating in the RSFSR a service for urgent medical care in emergency situations and by switching health care over to the new economic conditions. For that purpose, it was recommended that the departments' operations be set up for two modes—routine conditions and emergency conditions. The primary task of the routine operations is considered to be the rendering of urgent consultation assistance to patients in treatment-and-prevention facilities of administrative-territory rayons. The indications for urgent medical care are difficult-to-diagnose conditions, life-threatening conditions, or negative course of an illness as a result of ineffective treatment. Planned consultation assistance is excluded from the operations of the departments. The job of a department during operations in emergency conditions is as follows: create a data bank on the available personnel (special teams) and materials (medication stocks, equipment, gear, medical articles, vehicles) and their locations in the territorial service for urgent medical care in emergency situations; develop the best routes and systems for the swift delivery of manpower and equipment into the emergency area; set up immediate delivery of specialists and medical cargoes as needed; evacuate victims to treatment facilities; set up

round-the-clock communications for the transmission and reception of information between structures of the territorial service, the regional and All-Union centers for urgent medical assistance, and the RSFSR Ministry of Health.

The board approved the Provisional Statute on the Urgent Consultation Assistance Department of the Republic, Kray, and Oblast Hospitals.

The resolution adopted by the board on that issue outlined a complex of measures aimed at further development and improvement of the medical aviation service in the republic. ©COPYRIGHT: Izdatelstvo "Meditsina", 1991

### **RSFSR Reviews Drug, Alcohol Treatment Work**

917C0559B Moscow ZDRAVOOKHRANENIYE  
ROSSIYSKOY FEDERATSII in Russian No 1, Jan 91  
pp 31-32

[Article by I. A. Nikiforov, A. V. Shevchenko (Moscow), under the rubric "Information": "At the Board of the RSFSR Ministry of Health"]

UDC 616.89-008.441.13-084.4(470)

[Text] At a number of meetings of the Interdepartmental Council for Control of Alcoholism, Drug Abuse, and Toxic Substance Abuse in the RSFSR Ministry of Health, discussions were held on the work of health care organs of the Komi ASSR, the Kalmyk ASSR, the Krasnodar Kray, and the Tyumen, Arkhangelsk, Chelyabinsk, Orenburg, Kirov, Kemerovo, Volgograd, and Tver oblasts in improving substance abuse treatment for the public.

It was noted that health care organs and facilities, together with other interested departments, have developed comprehensive plans for preventing alcoholism, drug abuse, and toxic-substance abuse. Questions involving the control of drug abuse are examined on a regular basis by the health care boards, commissions, and councils for controlling alcoholism and drug abuse, where resolutions are passed to further develop the substance abuse treatment for the public.

Interrayon substance abuse treatment clinics have been set up, as have examination offices for alcohol and drug intoxication, offices for adolescents, offices for the prevention and treatment of drug abuse and toxic-substance abuse, and offices for confidential treatment. The post of district psychiatrist/substance abuse specialist has been introduced in rural areas.

At the same time, health care organ officials are not devoting proper attention to the development of substance-abuse treatment for the public. The commissions and councils for controlling alcoholism and drug abuse in the oblast health departments are not performing the

role of coordinating centers for the prevention of narcotics addiction and the early identification and treatment of addicts and individuals at risk. The work is not always planned for the long term, meetings are held on an erratic basis, decisions that are made are not always constructive, and their enforcement of those decisions is not monitored. The organizational-procedural departments of substance abuse clinics are not performing their functions to the fullest.

The material-technical base of substance abuse facilities and offices remains unsatisfactory. Clinics, departments, and substance abuse offices, especially those in rural areas, are located in makeshift facilities that do not meet health codes. There are 2-3 sq meters of useful area per bed (the standard is 7 sq meters). Health care organs are not taking effective measures to provide substance abuse facilities with their own material-technical base. For that reason, most of these facilities do not have offices or departments of functional diagnostics, drug-free treatment, or nontraditional therapy. For example, in the Volgograd oblast, not a single substance abuse clinic has been opened in five years; over that same period of time, the oblast clinic has not had its own premises (it rents from industrial enterprises), and no construction is planned.

The one-track orientation toward the development of substance-abuse subunits based at industrial enterprises has now placed many clinics on the brink of crisis. Because of the refusal of enterprises in the new economic conditions to extend the agreements that offer space for the treatment of substance abuse patients, there has been a sharp reduction in the number of beds available. In 1989 alone, 365 substance abuse beds (14.7 percent) were eliminated in the Kemerovo Oblast, two departments were shut down in Tver Oblast, and a number of permanent facilities were threatened with closing in the Orenburg Oblast.

In the midst of the change-over of operations to the new economic conditions, several of the named territories have found themselves with a shortage of interrayon substance abuse clinics, which makes it impossible to create centralized models of Narkologiya territorial medical associations.

There are not enough substance abuse specialists for the population. The staff levels do not meet the new personnel standards in any of the territories. For that reason, in the Volgograd Oblast, no drug-abuse prevention and treatment office has been opened, and only one physician is working in the organizational-procedural department—the department head; the position of substance abuse specialist for adolescents has not been filled. Personnel are inadequately trained. In Kalmyk ASSR, 50 percent of pediatrician/substance abuse specialists are not properly trained in the basic disciplines; in Arkhangelsk Oblast, 27 percent.

Physicians in the general treatment-and-prevention system remain passive in the matter of prevention of

narcotics addiction. Because they are not taking part in the work with the departments of internal affairs, public education, and the society for sobriety, the identification rate for alcoholism patients, especially in the early stages, and for individuals at risk for alcoholism, drug abuse, and toxic-substance abuse is steadily dropping, especially among women and adolescents. In 1989, the rate was an average of 20 percent lower than in 1988 for the territories under discussion.

At the same time, an alarming situation stemming from the consumption of alcohol and drugs has developed in all the territories. Over a three-year period, morbidity due to alcohol psychosis has grown by 118 percent in Komi ASSR, by 114 percent in Tver Oblast, by 70 percent in Kemerovo Oblast, by 59 percent in Orenburg Oblast, by 40 percent in Arkhangelsk Oblast, and by 26 percent in Kirov Oblast. A growth in dipsomania has also been noted.

Treatment-and-prevention work with patients identified as having a problem is done on a cursory basis and without any interest. Every year, substance abuse specialists fail to see 40-75 percent of first-time alcohol psychosis patients. Medical documentation is very careless, and the notes taken by physicians contain no specific information about the patient and do not reflect the dynamics of the disease. The range of treatment methods used by the psychiatrist/substance abuse specialists is extremely limited. The volume and terms of treatment at permanent facilities have been cut back. Every year, such treatment covers only 12-13 percent of patients. As before, a considerable number of alcoholism patients and almost all patients suffering from alcohol psychosis, drug abuse, or toxic-substance abuse—including women and adolescents—are treated at psychiatric facilities.

The work done with adolescents is set up in an extremely unsatisfactory fashion. Over a three-year period, not a single adolescent has been identified as a drug abuser in Kalmyk ASSR or in the Kirov and Arkhangelsk oblasts. And the work among the rural adolescent population in Chelyabinsk Oblast is poor. Adolescents are treated in the psychiatric departments of hospitals, clinical observation is cursory, a considerable number of the adolescents elude observation, and the rest are seen by a doctor once or twice a year.

Among the adult patients, only 40-50 percent are treated on an outpatient basis. Treatment is cursory and unimaginative, it relies on drugs, and it does not have enough psychotherapeutic support.

The medical, occupational, and social rehabilitation of drug-abuse and toxic-substance abuse patients has been ineffective for a number of years because collectives from enterprises, social organizations, and organs of internal affairs take no part whatsoever in the process. No more than 2-4 percent of the patients (4-5 percent in the RSFSR) are removed from the clinical rolls every year because they have shown steady improvement.



In addition, the number of patients needing forced treatment for alcoholism and drug abuse is growing. They represent 4.5-6 percent. At the same time, as much as 40 percent of the places in treatment-and-occupational-rehabilitation (TOR) facilities are empty in those territories, and the number of consultations on the use of Art. 62 UK RSFSR represents more than 55 percent of the number of all those conducted every year. Patients who are released from the TOR facilities do not receive preventive or maintenance treatment, and more than 30 percent of them do not see psychiatrist/substance abuse specialists, do not work, and continue to abuse alcohol.

Serious flaws have been noted in the work of the health care organs and facilities of the territories under discussion in the prevention and treatment of drug abuse and toxic-substance abuse.

More than 70 percent of patients and individuals from groups registered for drug-abuse prevention elude treatment, and only a few are brought to admissions, because of inadequate interaction in the work with organs of internal affairs.

The treatment of that contingent of patients is poorly organized. Outpatient treatment received no more than 30 percent of the patients. In outlying regions of the oblasts, that figure is even lower; whereas the number of toxic-substance abuse patients in those regions has grown in the past three years. A considerable number elude treatment. Only in a few instances are drug-abuse patients sent to TOR facilities; and in Kirov Oblast, for four years now, TOR work hasn't been done at all. At the same time, annually, as many as 15 percent of patients registered for drug abuse are brought in for treatment under Art. 62 UK RSFSR in connection with crimes committed under the influence of drugs.

Health care facilities do a poor job of promoting antialcoholism. Despite the increased number of lectures and conversations held among the people, by and large no qualitative breakthrough has taken place in the promotion of a sober lifestyle by health centers or by medical workers of substance abuse centers and the general treatment-and-prevention system. The effectiveness of that work is steadily dropping and does not evoke any interest from its audience. A serious problem with that work is that it does not use the mass media enough, especially radio and television, the press, and video films.

All that points to the poor quality of the work being done to improve substance abuse-related assistance for the population, to the absence of serious analysis of the situation, and to the untimely fashion of directive measures by health care, the organizational-procedural departments of substance abuse facilities, and the chief substance abuse specialists.

In Komi ASSR, Kalmyk ASSR, and oblasts such as Orenburg and Kirov, documentation has yet to be prepared to change the substance abuse service over to operation in the new economic conditions.

The interdepartmental council has called the attention of the leaders of the health care organs of those territories to the slow development of the system of substance abuse facilities, their material-technical base, and the manpower potential, as well as to the ineffectiveness of their operations.

The council recommended to the health care organs of Komi ASSR, Kalmyk ASSR, and the Orenburg, Kemerovo, Volgograd, Tyumen, Arkhangelsk, Kirov, and Chelyabinsk oblasts, as well as the Krasnodar Kray, that they put together a program for the development of the substance abuse service that will include the construction of new substance abuse facilities by standard design; the functional consolidation of substance abuse services within the framework of the Narkologiya territorial medical associations; the staffing of substance abuse clinics with skilled physicians and mid-level medical personnel; the widespread development of the sector involving confidential treatment of patients, to include operation on a cost-accounting basis; the active recruitment of psychotherapists and medical psychologists into the treatment process; the assigning of a high priority to the use of psychotherapy in combined treatment regimes; the development of a system of occupational and social rehabilitation of patients at substance abuse facilities; and the introduction of leasing and collective and team forms of labor organization. ©COPYRIGHT: Izdatelstvo "Meditina", 1991

#### Reader Response to TRUD Article on Drug Shortage

917C0678C Moscow TRUD in Russian 17 Jul 91 p 1

[Article consists of letters to the editor about the drug shortage: "The Pharmacies Are Empty. Do We Forbid People to Get Sick?: What We Have Come to..."; first paragraph is source introduction]

[Text] The articles "A Country of Dying People?" and "As We Live, So We Cure Ourselves" (TRUD, 18 May and 15 June) about the severe problem of the drug shortage evoked a tremendous flow of letters to the editor. Those despairing people aren't even asking anybody to help them get this medicine or that—they're more like opening their arms in a gesture of puzzlement, asking, How can this be?

In the spring of this year, my mother had a "household" injury. She was cutting some bread for lunch, and the knife slipped. The cut wasn't all that big, but the blood was spurting like a fountain. We didn't have any iodine or any absorbent cotton at home, so we went to the neighbors. We found some iodine, but nobody had any cotton. We wrapped the wound up with something else. As a result, she got blood poisoning.



[Signed] V. Perov, Kiev

My daughter, a 13-year-old girl, was found to have kidney stones. She's in terrible pain. But they wouldn't admit her into the hospital unless she had, one, her own no-shpa [medicine] and, two, her own baralgin [medicine]. And then they gave her a very long list of drugs she needs to have. I found them! I had to beg the head of a pharmacy, and plead. I managed to get the drugs, and I paid for them all.

But what do other people do? What do old people do who are suffering from kidney stones? Where do they get the money to pay the high prices that speculators get? It's a very interesting system we have. You might call it free medicine, but the money still flows and flows...

[Signed] A. Barysheva, Moscow

It's very frightening when something is wrong with your eyes. But the most frightening thing is when you know that someone close to you is on the verge of blindness. And the light grows dim in your own eyes from pity and sorrow.... But you do what you can. In searching for the pilokarpin that's needed for glaucoma, I think I've gone around to every pharmacy. And everywhere, in answer to my question, I hear, "What, are you mocking us? What do you mean, pilokarpin?"

I'm not mocking anybody. I'm being mocked. And so are those who are going blind and those who are sick.

[Signed] N. A., Moscow Oblast

My little son has allergies, and he gets a terrible reaction to dust. The attacks that he has periodically are very much like bronchial asthma attacks. You just can't bear seeing it.

His allergy got worse in the spring. He ended up choking in my arms, pulling at his already unbuttoned collar, trying to get some air down. The emergency medical people came. They helped him and told me what I needed to treat him with. But they couldn't leave even a tiny vial of taverlin, much less any suprastin or a bottle of Astmopena. You see, they told me, if we leave it with you, then we won't be able to save some other person. Lord, what have things come to?

[Signed] I. Sayenko, Yaroslavl

### Correspondent Surveys Local Pharmacies

917C0678D Moscow TRUD in Russian 17 Jul 91 p 1

[Article by V. Kirsanova: "It's as if Leeches Are Sucking Our Blood"; first paragraph is source introduction]

[Text] Our correspondent went to several pharmacies in the capital. Her raid doesn't need any further comment.

The pharmacy near the Varshavskaya metro stop. "Do you have any Analgin?" "No." "Pilokarpin or eye drops?" "Haven't for a long time." "Anything for the heart?" "Unfortunately,..."

Unfortunately, that "substantive" dialogue is like thousands of other such dialogues. In pharmacy No. 5 of the Frunza District, the store window is relatively full. Of the drugs in short supply, it has citramon, streptocid, mustard plaster, other plasters, iodine in ampules.

"The shipment just came," explains T. Trofimova, a pharmacist. "But the drugs allotted to our pharmacy for a month will barely last a week. They didn't give us any Analgin or heart drugs at all—except for liquid validol. We haven't had any absorbent cotton for three months now."

Near the rayon pharmacy No. 87, which is at the head of Tverskaya Street, there's a swarming crowd of people. Rouge-cheeked women and their dashing men are selling perfumes and cosmetics bought at wholesale stores. No, there's no medicines to be found there, or even in the pharmacy itself. The shelves in the store window are empty under signs that read "Gastrointestinals," "Cardiovascular Medications," "Pain Relievers." There's only valerian and vitamins. "Now, in the season of natural vitamins, there's no demand for them," says O. Selezneva, a druggist. "On the other hand, there weren't any in the winter and the spring. And the overall shortage of drugs is growing from day to day. Every month, some miserly amount comes in—a twentieth of the allotment!"

It's sad. It also seems sad to me how the medical leeches hanging around in the turgid water of the aquarium follow the rare visitors. Their "faces" are sad. It's as if the poor things are predicting that all we'll soon have left are them and castor oil.

And the homeopathic pharmacies haven't avoided shortages. The head of pharmacy No. 4 on B. Khmel'nitskiy Street, N. Nerina, described the present situation this way. Interest in homeopathy is very great right now. So great that there aren't enough external preparations—salves and extracts.

Things are a little better in central pharmacy No. 476 of the Kuznetsk District, which is located in Krylatskiy. There is a shortage of corvalol, nitroglycerin, streptocid, cold medicines, plaster, bandages, and absorbent cotton. But it's not always that way. The head of the pharmacy, R. Kalinina, has been in pharmacology for more than 30 years. Right now under authority are 17 district pharmacies. Here's her opinion:

"We've never had a situation like this with drugs. But the nature of this next shortage is entirely explainable—it's very intimately tied to the collapsing economy. Domestic pharmacology isn't rejoicing. The absence of raw materials is slowing the manufacture of products, and some plants are closing down altogether.

"Recent suppliers—Hungary, Poland, the former GDR, Bulgaria—have virtually halted deliveries they were making under contract, and the percentage of imported drugs was very high. Now in short supply are such widely used drugs as phestal, adelphan, many gastrointestinals

from India, eye drops from Finland; there's almost no diabetes drugs. Now we have to buy all that with hard currency, but unfortunately, we don't have any."

If things keep going this way, will we have to use, as in the olden days, herbs and leeches, and even go running to medicine men?

### TRUD Editors' Open Letter on Drug Shortages

917C0678E Moscow TRUD in Russian 17 Jul 91 p 1

[Editorial that is an open letter on drug shortages: "Open Letter to V. S. Pavlov, Chairman of the USSR Cabinet of Ministers"]

[Text]

Dear Valentin Sergeyevich!

We have problems everywhere these days. The shortages of everything, everywhere, have become a part of our life, it seems. Plants and factories are shutting down, and right before our eyes the economy is collapsing and people are becoming impoverished. We are aware of how much weight is on your shoulders under such conditions and of how many bewildered, pointed, malicious questions are aimed at you. We wouldn't want to add to them. But there is a special problem that we simply can't turn our backs on. Even during the war, they say, in the years of the heaviest devastation, the situation with drugs and medications in our country was not as catastrophic as it is today. We're short of analgesics, heart drugs, and the most basic preparations and equipment. Hospitals recommend that you bring your own medications in, and the physicians are in a panic. It's as if we should just issue a regular ukase that forbids people to get sick. Or are we on the threshold of planned extinction? And aren't there many cases in which people left this life because they didn't have the proper medicine?

The readers of TRUD have a right to ask their government—Why has such an emergency situation come about in medicine, and is the money earmarked for the purchase of drugs and equipment—including hard currency—being spent? Why have the many promises of the ministries to "sort things out, make some adjustments, and improve things" remained on paper only? And the main question: What lies ahead? When will there be even a spark of hope? Realizing that all this is of immediate concern to the governments of the republics, too, we think that this is nothing to be "split up" here, and the population is rightly counting on coordinated action between the republic governments and your cabinet.

Our newspaper has raised these questions and others many times. But we—that is, millions of readers—haven't received a single intelligible official answer: at best, only empty promises have come to the editorial office. But you and your ministers get sick sometimes, and you somehow manage to get treatment, don't you? Or are the problems of the shortage perceived in the higher circles as theoretical, so to speak?

But even in that case, our readers and patients, who are not ministers, have a right to expect greater specificity and interest on the part of the government in the answers to the questions that are tormenting everyone. That is, if the government is, of course, not only healthy (God hopes so!), but also sane. In the hopes of that, we are appealing to you, Valentin Sergeyevich. And we're waiting for a quick, substantive answer.

### Soviet Union Lacks Domestically Produced Diagnostic Systems for Endocrinopathies

917C0679A Moscow PRAVDA in Russian 2 Jul 91  
2nd ed. p 2

[Article by Ye. Marova, chief RSFSR endocrinologist, USSR state prize laureate, and director of the Institute of Clinical Endocrinology, All-Union Endocrinology Science Center, USSR Academy of Medical Sciences; Prof. M. Balabolkin, director of the Diabetes Institute, All-Union Endocrinology Science Center, USSR Academy of Medical Sciences, and science secretary of the All-Union Endocrinology Society; Prof. N. Goncharov, director of the Laboratory for Hormonal Analysis, All-Union Endocrinology Science Center, USSR Academy of Medical Sciences; and Cand. Med. Sci. K. Aleksandrov, science secretary of the All-Union Endocrinology Science Center, USSR Academy of Medical Sciences; under the rubric "Medicine: A Letter to the Editor": "Time Is What's Needed..."; first paragraph is source introduction]

[Text] Right now in the USSR, there are virtually no diagnostic systems for any disease—above all, diseases of the endocrine system. As a result, tens of millions of people suffering from diseases such as diabetes mellitus or various forms of thyroid dysfunction can't have prompt hormonal studies done, accurate diagnosis, or, consequently, adequate and efficacious treatment.

Early diagnosis, choice of the best treatment methods and systems, evaluation of their efficacy, and disease prognosis are absolutely impossible in modern endocrinology without highly sensitive, reliable diagnostic systems.

Take, for example, diabetes mellitus. It's a heterogeneous disease. The determination of the blood levels of insulin and C peptide and the performance of a series of functional tests make it possible to ascertain the specific type of diabetes. It is an extremely important moment in the life of the patient. At present, diagnostic systems are being developed that enable identification of potential diabetes patients from among healthy individuals many years before the appearance of clinical signs of the disease. That is opening real possibilities for the use of a complex of measures to either prevent the onset of a number of endocrine diseases or achieve long-term postponement of their manifestation.

No less important for our country is the problem of thyroid disease. The fact is that nearly 70 percent of the area of the USSR is in regions in which there is a natural

deficiency (in the water, food products, etc.) of the iodine component needed for biosynthesis of thyroid hormones. Those hormones play a key role in the regulation of virtually all the vitally important processes in the body and in the build-up and maintenance of the intellectual and creative potential of the individual. It is well known that no matter how rich the hereditary information a child receives from his parents, a mere deficiency of thyroid hormones will lead to the development of oligophrenia.

In such regions, if the prevention of iodine deficiency is poorly organized, 30 percent of the adult population will suffer from enlargement of the thyroid gland, and varying degrees of mental deficiency may be identified in children.

The disease structure in the endemic regions is substantially altered now: There has been an increase in the number of individuals with hypothyroiditis, autoimmune thyroiditis, and malignant neoplasms.

The key hormonal indicator of congenital hypothyroiditis is the blood content of thyroid-stimulating hormone (TSH). An accurate diagnosis made in the very first hours after birth on the basis of TSH levels and the prescription of thyroid hormone guarantees the normal development of the child. That's what is done in the developed countries of the world. Our country, unfortunately, does not have such diagnostic systems and does not screen newborns.

There is special urgency with the problem of diagnosis of damage to the thyroid gland in the populations living in the area affected by the Chernobyl accident. Determining thyroid gland function and possible variations of damage requires hormonal analysis in an enormous contingent of individuals. Also necessary are ongoing studies that span decades, especially in children. Domestic endocrinology, however, does not have the necessary diagnostic systems, and that at a time when the situation involving the examination of thyroid gland condition in the populations of controlled areas of the RSFSR, the Ukraine, and Belorussia is extremely dramatic.

Diagnosis and treatment of disorders of sexual function, including those of the reproductive systems of men and women, are possible only if endocrinologists and gynecologists have diagnostic test kits for identifying such key hypophyseal hormones as follicle-stimulating hormone (FSH), luteinizing hormone (LH), and prolactin and the basic sex hormones of estradiol, progesterone, and testosterone.

Our country's medical sector, to our great misfortune (and it's not for the first time!), can't perform any such tests and is completely dependent on purchases of diagnostic systems from abroad.

We could speak about the extremely severe diseases of the adrenal glands, but we would inevitably end up

asking the question—Just why is the situation so dramatic with diagnostic systems in this country? And who is responsible for the situation that millions of individuals find themselves in?

This is a good place for a brief excursion into the quite recent history of the development of domestic hormonal test kits. It's a very instructive history. In fact, it is a history of the monopoly of two principal "dramatis personae" that led, without exaggeration, to the complete failure of an entire service of the country.

One of the dramatis personae is V. A. Knyazhev, head of the department "Problems in Medicine and Health Care" of the State Committee for Science and Technology (GKNT) of the USSR Council of Ministers. The second dramatis persona is A. S. Ametov, who in the recent past was the head of the Laboratory for Radioimmune Studies at the Central Institute for Postgraduate Medicine of the USSR Ministry of Health and for the last two years has headed the Department of Endocrinology at that same institute.

It is absolutely clear that the primary function of the "Problems in Medicine and Health Care" department of the State Committee for Science and Technology is to develop priority projects aimed at solving the most urgent problems in medicine and health care. It is also absolutely obvious that the GKNT is to bring together specialists and creative groups from various fields of theoretical and applied science to attain goals that consist of solving problems that are of a theoretical and practical nature and are of some urgency for the country.

A candidate of medical science, and a physiotherapist in the distant past, V. A. Knyazhev is not, of course, capable of dealing with a problem with such a global nature as that that was facing the department he headed!

Officials usually have a lot of advisers who are specialists! It stands to reason that one can expect fruitful results from science projects in which there are at least elements of objectivity.

The first act of the play began with A. S. Ametov being appointed coordinator of the state program Mikroanaliz [Microanalysis] for the purpose of developing domestic diagnostic systems for identifying hormones, and at the same time, he and his laboratory were approved as medical coengineer and coproducer of those diagnostic kits. The main quality-control expert for the test kits that he produced was, again, A. S. Ametov. And it was he who determined the nomenclature and volume of purchases of kits abroad, as well as the choice of foreign partner-firms. In addition, Ametov was the main distributor (he was the commission chairman) of all the diagnostic systems purchased abroad and all the domestic diagnostic kits for the regions of the USSR.

It was that kind of gigantic monopoly and a total lack of supervision, both of which later torpedoed the initiative of other scientists, that led to the collapse of the government program to develop and manufacture domestic

diagnostic systems. As was to be expected, the quality of the diagnostic kits manufactured at the Minsk production complex dropped sharply, and in 1988 the diagnostic kits for identifying a whole array of critical hormones ceased entirely to meet the needs of clinical practice, i.e., the kits for estradiol, progesterone, and testosterone all had to be recalled. Results that were achieved in the identification of hydrocortisone, thyroxine, triiodothyronine, and growth hormone (the last hormone is manufactured in Kaunas) turned out to be non-reproducible.

The producers and coengineers came under sharp criticism at the All-Russian Society of Endocrinologists (Sverdlovsk, 1988) and at the All-Union Interdepartmental Seminar for RIA-Kit Needs and Quality Assurance (Obninsk, 1989). The use of a whole array of diagnostic kits was vetoed because of extremely poor quality. Clinics were without means for prompt diagnosis of, for example, diseases of the adrenal glands, the sex glands, and the thyroid gland and tumors of the hypophysis.

Department "02" of the Mikroanaliz program, which involves the development and manufacture at the Minsk plant of RIA kits for a group of hypophyseal hormones—FSH, LH, TRH, ACTH, and prolactin—has remained completely "untouched." Whether Knyazhev and Ametov wanted it or not, the country must import the entire expensive spectrum of RIA kits for peptide hormones from capitalist countries. All of the realistic proposals made by domestic scientists who were not part of the Knyazhev-Ametov team, to swiftly set up production of a number of badly needed kits, were simply blocked.

That's why in 1990, pressured by the country's endocrinologists, who were driven to despair by the situation with the diagnostic systems, the USSR Ministry of Health assembled a group of experts to conduct an inquiry on the activity of the commission for distributing diagnostic kits to the republics and various regions. The findings of the inquiry were quite enlightening! They put people into a state of shock. People had suspected before that Ametov was, to put it mildly, taking liberties with the distribution of the kits. But the findings of the inquiry exceeded all expectations. For example, the central region of Russia, with a population of 17 million, had received no more than 6-7 percent of the imported kits; whereas the regions of the Far East, the Urals, Altay, and Eastern Siberia, with a population of more than 35 million, had received only 2-5 percent. Roughly the same situation with the supply of kits existed in the clinics of Western Siberia. That infinitesimal percentage makes it possible to perform proper tests for only about 3-5 percent of individuals with various endocrinopathies. On the other hand, it came out that the kits that had been purchased for hard currency often went to nonendocrinology facilities in incomparably higher quantities than were sent to endocrinology clinics. Consequently, endocrinopathy patients couldn't count on a fast, accurate diagnosis or timely treatment. By the beginning of 1991,

out of more than 100 hormone analysis kits, there were only three in the country. Based on the findings of the inquiry, Ametov was removed from the commission for the distribution of the diagnostic kits. And that's all!

It would seem that we have to roll up our sleeves and get to work digging the service out from under the avalanche. But we're certain that the endocrinologists of the country would never have suspected that Ametov, after destroying an entire service, is now a member of the Bureau of the Science Council of the USSR GKNT for Drugs and Test Systems, and Knyazhev is being appointed chairman of the commission "Priority Methods and Systems for the Diagnosis, Treatment, and Prevention of Endocrinopathies." Not a single one of us or any specialist in diabetes or clinical or basic endocrinology has ever been invited even once to any meeting of the above-named bureau or GKNT commission in which the extremely urgent problems associated with providing endocrinopathy patients with the scarce diagnostic systems were discussed.

A whole array of questions urgently need answers. They involve both the financing (in rubles and hard currency) and the personnel (staffing assignments) for areas of science. They involve both the purchase and distribution of equipment. Who determines the composition of business and creative meetings in the GKNT with domestic and foreign firms both in Moscow and outside the USSR, and how? Who has concluded contracts for the purchase of instruments from foreign firms—particularly for the purchase of the expensive licenses for the manufacture of RIA kits—and on the basis of what criteria were they concluded? Why has the GKNT not actively pursued a study of more adequate alternatives to nonisotope diagnostic systems for endocrinology? In light of the large number of endocrinopathies, a group of endocrinology specialists should be commissioned to swiftly develop a realistic program to bring domestic endocrinology out of the tragic situation it finds itself in.

Based on what has happened in endocrinology, we are convinced that much is being said about the inestimable value of health, but, as before, to our great regret, health and even life itself are in the hands of dilettantes and are being victimized by inexpert, irresponsible people who came out of nowhere. It's time to hold some people responsible, it's time to make some people start answering for this.

#### **End of Poulitce Production Monopoly Increases Supply**

*917C0679B Moscow SOVETSKAYA ROSSIYA  
in Russian 6 Sep 91 p 2*

[Article by V. Zlobin, special correspondent for SOVETSKAYA ROSSIYA, Saratov: "Everyone Will Have Plenty of Mustard Plasters: That's Now Become Possible Thanks to the Collapse of a Monopoly for the Production of That Simple Item"]



[Text] The much-maligned mustard plaster. Who of us has not rushed from pharmacy to pharmacy in search of that unassuming medical item because some catarrhal ailment has made a home in your house? And how often you return to the patient empty-handed!

Yes, there's a shortage. And it owes its existence to the fact that to this day, to meet the needs of the entire country, the production of those simple paper rectangles sprinkled with bitter powder has been a monopoly belonging to a single, solitary Volgograd plant. An old, old building with worn-out, broken-down equipment and caveman technology.

The years have gone by. The plant has had a dozen directors. But mustard plasters were in short supply when the directors came, and they were still that way when the directors left.

Here's an excerpt, for example, from one document: "For the purpose of increasing the output of mustard plasters, the NPO Maslozhirprom and the plant have developed a new technology for producing them. An agreement has been reached with the Italian firm IMA Soteka on the manufacture of equipment. The leadership of the oblast has requested that five Italian assembly lines for the plant be included in the plan for purchases of goods via import from capitalist countries."

That document appeared three years ago. Judging by it, practically the entire world community must be concerned about the half-collapsed plant on the Volga. Otherwise, in the shop the ventilation never would be working and the people would be choking in benzin vapors, and we, consequently, would never see any mustard plasters.

That's why, at first, I simply didn't believe this report: some small enterprise that was created just a little over a month ago at the Saratov Farmatsiya association has managed, in just that month or so, to produce five million medical mustard plasters. Five million!

"And that's just the beginning," I was assured by Vladimir Proskurnov, the general director of the Farmatsiya association. "If everything goes as planned, by the end of the year we should be able not only to supply our own pharmacies, but also to give our neighbors a hand."

Just what's it like, that small enterprise that is helping to solve such a huge problem, one that for many years has gone unsolved not only for Saratov, but also for the rest of the country?

Upon first seeing it, I must admit, I was shocked. I couldn't imagine an enterprise being any smaller than that "small enterprise." It's located in a small auxiliary space of one of the pharmacies, and it has no more than 15 sq. meters of floor space. It contained all the equipment—an automatic machine the size of a typewriter, an electric motor, rolls of paper, bags with the mustard mixture, and even boxes for the finished product. It

takes only two people to do the job—an operator and a packer. The former uses a special trowel, as would a croupier, to move the mustard powder from a little trough into the hopper of the automatic machine; the latter packs the finished product—that is, the mustard plasters—into boxes and seals the boxes.

The miniature automatic machine, it turns out, is capable of "turning out" as many as 50,000 items a shift. That means in a month, with two shifts working, it can produce nearly three million. What's remarkable is that those mustard plasters are considerably better than those that are "banged out" at the pitifully well-known Volgograd plant. As specialists note, those traditional Volgograd mustard-plaster paper rectangles have a number of substantial shortcomings: short shelf life (no more than a year), possibility of skin burn as a result of application, rapid decrease in efficacy during storage, poor hygiene (some of the mustard powder stays on the patient). In addition, we should point out that the technology for their manufacture is harmful to the ecology and literally presents an explosion hazard. The technology is impossible to effect without imported rubber, elastomeric adhesive, and benzin. That's why people in the shops of the Volgograd enterprise have to work in masks.

And here I am, holding a mustard plaster that was just made by the automatic machine. Even just on the outside, it's as different from its counterpart as day is from night. It's a neat, rectangular little package. One side is a dense, laminated polyethylene paper; the other side is porous, like a tea bag. Inside is the mustard mixture.

By the way, that medicinal form is not the fruit of someone's questionable work in a garage. Developed by the scientific production association Maslozhirprom, it has successfully undergone biomedical and clinical testing. It offers substantial advantages over the traditional mustard plaster: good hygiene, a doubled shelf-life, a more pronounced therapeutic action. That is to say, treatment with the new mustard plaster is more effective. In terms of quality, it is better than its foreign counterparts.

But what about the rubber, the adhesive, and the benzin that the Volgograders can't do without? Well, those things aren't needed at all in the new process. In the space where the automatic machine is operating, it's absolutely clean (like in a pharmacy!), and you can breathe freely and easily.

The production of the mustard plasters with the new technology was proposed by three engineers who had been working until that time in the Tashkent Aviation Association system—Yuriy, Goncharov, Malik Kadyrov, and Yuriy Nomofilov.

"It's without a doubt much, much better than what we would expect from abroad!" exclaims Proskurnov (remember when the Volgograders were making an effort to buy Italian equipment?).

And so the small enterprise sprang up. There was a pretty big fuss, understandably. It didn't turn out to be so easy to get the novelty legalized. But now all that's behind. The enterprise is in operation!

"Of course it can't supply the entire country yet," muses Vladimir Proskurnov. "But it can knock out the shortage. And we're no longer shaking with fear over whether tomorrow the old Volgograd plant will suddenly underproduce again. It's a frightening thing, a monopoly. But its end is near."

By the way, designer Yuriy Nomofilov, together with his colleagues, has developed and successfully tested a second, higher-capacity machine. Watching that amazing little machine work, you can't help but think about how often we, in depending on people abroad, do not notice what's right under our noses. And the fault lies, we repeat, with our home-grown monopolies. As they create a dependence on others, they are themselves choking on the "benzin vapors" and strangling us with the damn shortages.

#### Public Warned of Possible Contamination of Medicinal Plants

917C0680 Moscow SOVETSKAYA ROSSIYA  
in Russian 5 Jul 91 p 4

[Interview with T. Pleteneva, docent in the department of inorganic, physical, and colloid chemistry of the Moscow Medical Institute imeni M. M. Sechenov, by M. Nikolayeva, Moscow: "Beware of the...Plantain"; first two paragraphs are source introduction]

[Text] We're used to squandering our natural riches without thinking a thing about tomorrow. It's no secret to anyone that many medicinal plants that have in the past come to the rescue of people who are sick now contain toxic substances, heavy metals in particular—copper, lead, cadmium, mercury, chromium, zinc, and manganese. Toxic elements can remain in the soil for several decades. From there, they move with moisture into plants, fruits, roots, or leaves that those who are fond of natural medicines gather tirelessly. The harmful substances then make their way into drugs. Do we really have to abandon treatments that use medicinal plants? T. Pleteneva, a docent in the department of inorganic, physical, and colloid chemistry of the Moscow Medical Institute imeni M. M. Sechenov, shared her thoughts on the subject with us.

**Pleteneva:** Many medicinal plants that have been contaminated with toxic inorganic substances present a real threat to people's health. The aftermath of the Chernobyl accident is having its effect. Together with the Institute of Chemistry and Chemical Technology of the LiSSR Academy of Sciences, we analyzed some species of medicinal plant material. For example, in nettle leaves and hawthorn flowers, we found an excessive amount of copper; the birch leaf is a good storage facility for zinc and manganese; and the leaf of the plantain stores copper and zinc well.

A group of staff members from our department, headed by Prof. Yu. A. Yershov, is doing a great deal of work in biomonitoring—in other words, monitoring the ecological state of various biological targets, including medicinal-plant materials. Of course, considerably more nickel, copper, chromium, iron, and aluminum accumulate in plants in industrial areas than in plants in forest-park areas. Nevertheless, one can't say that it's absolutely safe to gather plants in "green" areas. The fact is that we still don't have legislated norms for the maximum allowable concentrations of heavy metals in medicinal plants. In the meantime, the USSR State Pharmacopoeia is supposed to be doing that.

Either way, I wouldn't recommend gathering plants near enterprises or highways, or in the city limits. We still don't know enough about the ecology. I'm reminded of a call by some central youth newspaper to gather apples from trees along Leninskiy Prospect—it was a waste! And those tireless mushroom-gatherers scouring the city districts in search of champions.

**SOVETSKAYA ROSSIYA:** Tell us, if one gets medicinal preparations in state stores or pharmacies, is their safety guaranteed?

**Pleteneva:** Unfortunately, for the moment, there are no grounds for optimism. Of course, wide-ranging work is being done right now to ascertain maximum allowable levels for the content of toxic components in mixtures and tablets and in medicinal-plant material. But we still don't have a strict list of established and verified levels. Specifically, no pharmacy can give you a guarantee of the relative quality of its products in terms of heavy-metal content.

**SOVETSKAYA ROSSIYA:** And what other problems is your laboratory working on?

**Pleteneva:** A great many. For example, certain medicinal forms are introduced into the body by means of injection—intravenous or intramuscular—and not via the gastric tract. Thus, if the plant is contaminated, you have "immediate entry" of the toxic elements into the blood. Moreover, the toxic elements immediately "take the place" of some useful, necessary substance. For example, in blood proteins, aluminum replaces iron, and in various enzymes, it squeezes out magnesium. In bone, calcium assumes the role of aggressor. All that leads to various types of illnesses that are associated with disrupted metabolism. Danger is presented especially by so-called combined toxicity, in which several elements—say, chromium and nickel—enter the body simultaneously. As a result, a whole array of diseases may occur, because the destructive action on the body is amplified severalfold. Our science does not yet have much data on combined toxicity. We are taking what are only the first steps in that area of medicine. We need to be aware of the entire mechanism underlying the behavior of toxic components in the human body, so that we can thereby prevent many illnesses that are associated with disruption of metabolism. In addition, we need to know "by



name" all the "target-organs" that are more susceptible to the action of harmful elements. Only then will we be able to predict the response of the body to a toxin attack.

### **Soviet-British Homeopathic Institute Created in Moscow**

917C0680B Moscow SOVETSKAYA ROSSIYA  
in Russian 5 Jul 91 p 4

[Article by T. Shvedovskaya, under the rubric "Experiment": "A Big Effect From Small Doses"]

[Text] My girlfriend Sasha gave birth to a second child, a boy. When the baby was a little over a month old, Sasha's chest started aching. At the hospital, they ordered an emergency operation; otherwise the children would be left without a mother. The infection, the contamination could spread throughout the entire body. Sasha was still a young woman, and all of a sudden, she was going to have an operation like that. No, something else has to be found. Sasha signed a piece of paper for the physicians that said that she and only she was responsible for whatever came of her having refused the operation; otherwise, they wouldn't let her go home. She left in tears. On the way home, her husband kept telling her that the infection was nothing to play around with.

It was a dank fall evening that Sasha went to an old woman she knows who is keen on homeopathy. The woman, after examining the sick Sasha, prescribed the "sweet little homeopathic spheres"—a mixture of a wide variety of medicinal drugs. The little spheres helped, and the operation wasn't needed.

One can't say that homeopathy is banned in our country. No, it simply isn't recognized. But it hasn't always been that way. A brief history of homeopathy goes something like this. In 1935, homeopaths in Russia were officially allowed to open their own treatment facilities. They created the All-Russian Homeopathic Society. There were courses that taught homeopathy.

In the late 1950s, V. I. Rybak organized the Moscow Society of Homeopathic Physicians. A homeopathic pharmacopoeia was published, and by that time more than 600 homeopathic agents had been developed in our country. But gradually the attitudes toward homeopathy grew increasingly cooler. Prof. B. V. Petrovskiy, the former USSR minister of health, spoke out in the 1970s, declaring that drugs such as snake and spider venoms were "harmful" to the body. A proposal was made to the USSR Supreme Soviet to ban the use of homeopathic drugs. The Supreme Soviet did not approve that proposal. It was decided to run an experiment first: compare homeopathic drugs with the conventional allopathic drugs. The experiment went on for more than a year in internal medicine and gynecology clinics and other clinics. The homeopathic drugs demonstrated a good therapeutic effect, especially in stomach illnesses. But the Ministry of Health didn't want to take note of its efficacy at that time, which resulted in a special order that banned the teaching of homeopathy.

In the meantime, homeopathic drugs have been in use throughout the world. They are especially popular, for example, in Great Britain. But what about here? At the moment, the situation is not as bad as it used to be. Moreover, unlike conventional medicine, it doesn't need any kind of financial aid or government subsidies. Recently, for example, a joint Soviet-British venture, the Homeopathy Center, was opened in Moscow, and it not only performs courses of treatment for patients, but also teaches homeopathy to specialists who have medical degrees. Physicians spend a year studying there—urologists, gynecologists, and ear-nose-throat specialists. The theory underlying the therapeutic action of homeopathic drugs is quite unique. Almost 200 years ago, the German physician C. Hahnemann proposed a system of treatment involving infinitesimally small doses of drugs. Hahnemann felt that a healthy individual would have no response to them. But an ailing skeleton or ailing tissue, which would be more sensitive, would experience some effect.

Homeopathic drugs don't have side effects. But the drugs must be tailored to each individual.

### **US Pharmaceutical Aid to Aral Region Reported**

917C0681A Moscow SELSKAYA ZHIZN in Russian  
8 Jun 91 p 2

[Article by TASS correspondent I. Barsukov, dateline Washington, D.C., June 7: "Aid for the Aral Region"]

[Text] American pharmaceutical companies are sending \$1.8 million worth of drugs and medical equipment to regions of Soviet Central Asia where they are urgently needed, the U.S. Department of State reported Thursday. A Soviet Il-76 transport aircraft will leave Washington's Dulles International Airport Friday morning with a humanitarian aid cargo and will arrive that same day in Alma-Ata. Then the medications and equipment will be distributed among 12 medical facilities in seven cities of Kazakhstan and Uzbekistan in the Aral Sea region.

As noted in the State Department announcement, those deliveries are being made within the framework of an initiative announced by U.S. President George Bush in December of last year for rendering medical care to the regions of the USSR that need it the most. Other such deliveries have already been made to various regions of the Soviet Union.

The shipments are coordinated by the international social organization, Hope (Nadezhda in Russian), with the support of the American government. Representatives of that organization will monitor the distribution of medical care among the treatment facilities in Kazakhstan and Uzbekistan.

The Aral Sea region, the U.S. State Department announced, "was chosen because of the presence of various chronic diseases caused by the ecological devastation of the Aral Sea. Subsequent deliveries are planned

for other regions of the Soviet Union that are experiencing acute shortages of pharmaceutical and medical systems for which there is an urgent need."

### Latvian Pharmaceuticals Prices Set by Market

917C0681B Riga SOVETSKAYA LATVIYA in Russian  
9 Jul 91 p 3

[Interview of Tamara Polikarpovna Klimovich, general director of the Latvian republic association Farmatsiya, by Ye. Maksimova: "The Pharmacy Goes to the Market"; first paragraph is source introduction]

[Text] This year, like never before, is rich in unpleasant surprises. In most cases, those surprises are associated with pricing policy, which, as explained to us, is dictated by the conditions of the imminent market freedom, which is supposed to guarantee a full and a well-managed life. For the time being, in fact, not one single price change has brought one or the other, but the surprises continue, and with clearly growing frequency. The next price change is slated for the inhabitants of Latvia for 10 July, when the prices for all drugs will rise by as much as 50 percent. Already, however, new, alarming questions are coming in on the newspaper editorial office's telephones, and we asked the general director of the republic association Farmatsiya, T. Klimovich, to clear some things up for us.

**SOVETSKAYA LATVIYA:** Tamara Polikarpovna, what is behind the action [price hike] that is, in a very direct sense of the word, touching the vital interests of the people?

**Klimovich:** Primarily the fact that late last year and especially this year, the pharmaceutical enterprises began delivering drugs in the context of freely agreed-upon prices. That's certainly to be expected. After all, our medical industry for a long time has gone virtually undeveloped—obsolete, low-capacity plants operating with old technologies and equipment. That sphere has always been subsidized out of the state budget, but finally everything is to go to normal trade relations.

**SOVETSKAYA LATVIYA:** But isn't medicine today a field in which maintenance of subsidies is entirely justified?

**Klimovich:** You remember that, early this year, Mr. Godmanis announced that prices for medications would not rise, and the state would allot 50 million rubles (R) in subsidies for that sphere. But the Supreme Soviet of Latvia made a different decision, primarily because, when Estonia and Lithuania raised their prices for drugs, the Latvian market ended up unprotected. The drugs in our pharmacies near the border were quickly bought up. That is why we reached the conclusion that it wasn't the drug producer who should be subsidized, but the individual himself, that is, the individual who is ill needs to be compensated the full or partial amount of the price that has risen.

**SOVETSKAYA LATVIYA:** And what is the mechanism underlying that compensation?

**Klimovich:** The 28 June decree of the Latvian Council of Ministers defined three categories for exempted acquisition of drugs. In the first category, the free acquisition of drugs is maintained for all 31 types of illnesses that enjoyed that privilege before, and a new illness has been added—glaucoma. The second category of those receiving drugs for free includes the war disabled and war veterans, individuals who have been subjected to unwarranted repression, individuals who, as children, were in any concentration camp, and individuals who lived in the Chernobyl area or who helped in the cleanup of the accident. And also, children 18 or under of those living or working in that area. There's also something new: If individuals disabled since childhood had previously received free drugs only if they received a minimum level of monetary assistance, now disabled children 16 years old or under will get their drugs free, regardless of the size of the assistance they receive. The third category of "privileged" consists of those who were receiving drugs half-price. Now, because of the price hike for preparations, the preferential discount is being increased to 80 percent, that is, they will have to pay for only 20 percent of the cost. That group comprises retired people receiving a minimum pension, groups I and II individuals with job-related disability, and those who lived through the siege of Leningrad.

**SOVETSKAYA LATVIYA:** The benefits you've enumerated nevertheless don't affect a very large portion of the population in terms of number. What awaits the rest of the population?

**Klimovich:** For them, the following has been provided: If a drug is obtained with a prescription written by a physician from a state treatment facility, then the individual will have to pay only 70 percent of the cost. No discounts are given for prescriptions written by cooperatives or private physicians. On average, the per capita spending for drugs in the republic is R33. Now, according to estimates, that sum will be a little over R70. That means R5-6 a month. And we had to decide whether it would be better to give each individual that R5 every month, or give the patient who is getting drugs with a physician's prescription a 30 percent discount. The second choice was felt to be preferable, because anyone can come down with a serious illness that could require expensive drugs, and the discount would exceed those 5 rubles. It is estimated that, in the second half of the year, the republic will pay out a total of R28.9 million for all types of exemptions.

**SOVETSKAYA LATVIYA:** It's no secret that in polyclinics today, patients must wait in long, tiring lines. But now, when people go to the polyclinic for a prescription for even the most basic drug, in order to get that 30 percent discount, won't that just be more trouble for the patient as well as the medical people? Won't it affect the quality of the care given by district physicians? And finally, won't it bring on abuses?

**Klimovich:** Those things could happen. But every negative aspect has its positive counterbalance. We often forget to see a physician, and now there's a reason to do it. In addition, we are thinking about expanding the list of drugs that can be given out without a prescription. Some people will come in for a prescription, others will prefer to pay the full price, but get the drug quickly. We have to give the individual a choice. As for abuses, all prescriptions will, of course, be counted by polyclinic and by rayon. The principle is, of course, good, but its implementation still has to be perfected. And you can understand that any system depends on honest people. The main thing, however, is to have an abundant supply of drugs in the pharmacies, and then all the problems will go away by themselves.

**SOVETSKAYA LATVIYA:** Yes, well, now everyone is worried about the rumor that says that a drug famine is on the way. What about that?

**Klimovich:** We've long had difficulties with shipments of medical preparations. But, fortunately, we ended last year with a large surplus of goods—some R65 million worth. And the annual sale in the republic amounts to R90 million. That meant we got a full six months covered. But from here on, the situation will be rather "tight." Our main suppliers of imported drugs—Hungary, Bulgaria, Yugoslavia, etc.—are known to already have finished products that we cannot buy, because we don't have hard currency. But recently in the USSR Ministry of Health, there was a meeting on that problem, and we hope that the problem will be resolved. If the two sides reach an agreement, we will have drugs, because, as before, we get them through a central outlet, from the Union.

**SOVETSKAYA LATVIYA:** Let's look at some "popular" drugs and at how their prices will change.

**Klimovich:** Well, the widely used heart drug ATF now costs R1.82, and as of 10 July it will cost R4. Validol now costs 12 copecks; as of 10 July, 51 copecks. Valocardin is now 30 copecks; as of 10 July, 33. Citramon will go to 14 copecks from 13, and corvalol, to 32 copecks from 20. Analgin will remain the same price.

**SOVETSKAYA LATVIYA:** Based on those examples, it's hard to see any system. Won't it turn out that there'll be some sort of secretly agreed-upon prices for the products?

**Klimovich:** No, there'll be a system. Upon receiving drugs at the new prices, the pharmacy itself will reprice the old stock. For that reason, it may turn out that you'll buy a drug in one pharmacy at the new price, and next door you'll see it at the lower, old price. That is, there can only be two prices. Of course, we still have to see how, in practice, both the medical people and the patients accept the system. We will be refining it.

**SOVETSKAYA LATVIYA:** What can I add to all this? Only that all the heretofore performed monetary manipulations have in fact been "refined." By life itself and by

day-to-day practice. And the realities, as a rule, differ vastly from the computations set down on paper, and not in favor of the individual. I guess once again we shall see what we shall see.

### RSFSR Health Minister Kalinin on Republic's Medical Supplies Problems

917C0682A Moscow IZVESTIYA in Russian 5 Jul 91  
Union ed. p 4

[Interview with V. Kalinin, RSFSR health minister, and V. Deygin, deputy RSFSR health minister, by L. Ivchenko, under the rubric "From Informed Sources": "Drugs During the Shortage"; first paragraph is source introduction]

[Text] The RSFSR Supreme Soviet has reviewed the situation with the republic's drug supply and has recommended the adoption of a program of emergency measures. The program must re-create pharmaceutical production virtually from scratch—a great many enterprises that manufacture drugs are in a poverty situation, equipment is worn out, facilities are decrepit, and working conditions don't measure up to any norms. As a result, the output of domestic preparations has dropped by one-third as compared with last year, and literally every day, some drug is disappearing.

**Kalinin:** Since September of the past year, when I took this post, we have been working on nothing but eliminating the acute lack of medications: We're looking for ways to reactivate plants and shops that had closed down and to build new ones, and we're looking for possibilities for collaboration with foreign partners. After all, the USSR Ministry of the Medical Industry, in saving itself now under the signboard of a government corporation, has abandoned a completely collapsed sector. The reasons are many, and some are sound, but that doesn't change things.

**IZVESTIYA:** Much has been said and written about that. Has nothing really ever been done to make a decisive break?

**Kalinin:** Well, we're trying. The policies of the Union government in the past years have led to our actually assisting the development of the pharmaceutical industry of the CEMA countries instead of creating our own. And now, when the socialist camp has fallen apart, we are bearing the fruits of our shortsightedness. Our dependence on foreign countries for drugs has gotten worse. But even now, the policies of the center in that realm are not well-thought-out, even though it is aware of the extreme poverty of the medical industry, which doesn't have a single enterprise that can meet international standards, the government has not earmarked funds for reconstruction and capital construction in the sector. And even the hard currency that has come to the pharmaceutical industry is being used irrationally, and cases are known in which poor deals are made, in which better things could have been bought cheaper, and that means more of them could have been bought to better

cover shortfalls. In addition, some percentage of hard currency is best spent on acquiring substances, ingredients, and even tablets wholesale, so that we can then package them ourselves—in doing so, we can save some tidy sums. Especially since any firm, to accommodate the substances being bought, can provide the technology, too, for completing the cycle. That is why we decided to go our own way and create a pharmaceutical industry of Russia, and we are finding some understanding among our Russian republic leaders. The government is allotting 290 million rubles (R) for the reconstruction and the capital construction of pharmaceutical enterprises in Russia. I. Sidayev has promised also that, if need be, he will review the question of additional appropriations.

**IZVESTIYA:** And how do you intend to distribute those monies? After all, the pharmaceutical enterprises, most of which are in Russia, are part of that same Union corporation in which the Ministry of the Medical Industry has sought shelter.

**Deygin:** I witnessed under how much pressure it was formed. Both Premier Pavlov and the former medical industry minister, Bykov, twisted arms, as it were, in the enterprises and forced them to join the corporation by threatening to deprive them of resources. But the situation with the corporation, which is supposed to be voluntary, does not preclude the participation of its members in other structures, such as joint ventures or joint-stock companies, in which the enterprise has more independence. By the way, the RSFSR government is offering tax exemptions to pharmaceutical plants, and some may be privatized. So if it would be simpler and more advantageous to be with us, they would make the switch to be under the jurisdiction of Russia. That's something that the labor collectives themselves will decide.

But let's go back to investments. Russia is investing money in the growth of enterprises, but is requiring a return of those sums in the form of finished products—drugs for the republic. For example, in Kursk, a plant that produces a long list of various drugs will get our financial support. The collective there is working energetically, and already they are providing a rather large quantity of paracetamol—an analgesic—and we have no doubt that we will get all our money back in the form of finished drug products. We expect to create a network of joint-stock companies based on existing plants.

**IZVESTIYA:** The rates at which we do things are known to everyone—maybe subsidies don't help: sometimes there aren't any, sometimes they're not consistent. Is there any way to achieve rapid production of, say, the most basic, most widely used medications?

**Deygin:** Yes. Through cooperative efforts with foreign partners. And we are intensely developing plans for such cooperation. Foreign firms have their own problems. For example, in Greece there are two new drug-producing plants. The Greeks are proposing that we either buy those enterprises or become partners in a joint-stock

company (by the way, Greece has 108 pharmaceutical enterprises, and we have only 43, for all of Russia!). A similar proposal has come to us from Austria. After all, a firm whose enterprise is empty considers itself fortunate to be able to stoke it with work, but we have an abundance of work. The authorized capital for such a joint-stock company is \$10 million, half of which we must invest. After investing our part, it would only take a year for us to get all the drugs we need, and cheaper by a factor of 3, 5, or even 10! But let's assume that we don't have that \$5 million right now. The first invests that money for us, and after two years, when we make a profit, we repay the loan. With that much authorized capital, the net profit would be \$17-18 million, and out of our half of that profit, not only would we repay the loan, but also there would be some left to fund the growth of the republic's pharmaceutical industry. The pharmaceutical business abroad is the No. 1 business!

Right now in the RSFSR Ministry of Health, they are reviewing nearly 30 such projects that would be beneficial to both sides—in addition to the proposals I just mentioned, there are proposals from our colleagues in Belgium and Ireland. Plans call for the creation of a number of joint-stock firms for the production of antibiotics, vitamins, immune preparations, etc.

**IZVESTIYA:** And what about the most basic preparations—such as iodine, zelenka [alcohol-based item for external use], mustard plasters—which were quite abundant at one time, but now are being “flushed out” of production as cheap items that are not advantageous?

**Deygin:** Any item can be made advantageous—through tax policy. People can be enticed into producing them by removing the taxes on cheap items and abolishing the ceiling on how much manufacturers can earn. In a word, we will make our own line here. That's another approach we have to filling the pharmacies quickly. If something doesn't get in the way.

**IZVESTIYA:** And what's getting in the way now?

**Deygin:** Well, if we could just get from the Union ministry our share of hard currency for purchases. I can't even begin to tell you how many letters have been written, and how many inquiries and intercessions have been made! The Ministry of Health either says nothing or sends some incomprehensible answer. Russia's quota is 54 percent, and there's no way they want to part with that sum. The ministry still has this dictate: you make the request, and we'll buy it for you. So we made the request. Last year, we asked for seduxen—and they didn't give it to us and didn't even bother to tell us why not. And Russia ordered two million packages of terfen—a new, effective drug for treating asthma. The USSR Ministry of Health and Soyuzfarmatsiya ordered two million alright—for the entire country! And when the firm filled the order, the drugs with the Russian-republic labels stayed sitting in the firm's warehouse,



because Soyuzfarmatsiya took 500,000 packages! For us, Russia, it turns out that they don't have any more money.

**IZVESTIYA:** What have you managed to get done recently, and what drugs will show up in the near future?

**Deygin:** In Chelyabinsk, cardiovascular agents—particularly, cordaron—will be manufactured from substances brought in from Spanish pharmacists. In Belgorod, jointly with a Swiss firm, production of a new, effective ulcer preparation—cytotek—will get under way. The Akrikhin plant, in Kupavna, near Moscow, has already begun manufacturing one of the newest cardiovascular preparations, capoten. We'll have it as early as the end of the year, thanks to joint work with the very large firm Bristol Meyers Squibb. Preparations are under way for the construction of a plant that will manufacture insulin in Moscow—things are catastrophic right now in our country with insulin. Our own insulin production has halted, and we are buying it in various countries, from various firms. Some individuals are accustomed to a particular drug, and they can't tolerate generics. If we manage to construct a plant—by the way, one with ecologically clean production—we will be able to save our diabetics. A foreign firm is ready to invest \$50 million in its own money in that joint venture, which could be producing within 14 months. We need just one signature from Mossovet.

**IZVESTIYA:** The concerns about drugs are apparently important not only in terms of their being produced in sufficient quantities. We should probably already be thinking about the future—about the creation of new drug forms that will be competitive on the world market. But that's unthinkable without the research component.

**Deygin:** Of course. For that, we expect to create a republic center for the development and introduction of new drug preparations. Not right now, though!

#### **Deputy Premier Rakhimova on Shortages of Medical Supplies**

*917C0682B Moscow TRUD in Russian 31 Jul 91 p 1*

[Interview with B. F. Rakhimova, USSR deputy premier, by A. Kopteva: "Diagnosis: A Shortage"; first paragraph is source introduction]

**[Text] The drug shortage is an extremely urgent problem. This newspaper has brought the topic up more than once. Our pharmacies and our hospitals don't have even the most basic items. We asked USSR Deputy Premier B. F. Rakhimova to comment on the unusual situation that has come about in our country.**

**Rakhimova:** I began working at the post of USSR deputy premier in May. And in fact, the first issue that we had to tackle head-on immediately was the issue of the drug supply. The situation is truly strained. Unfortunately, this year the enterprises of the country's medical industry will deliver a mere 34 percent of the drugs that

are requested today. The enterprises have completely refused to produce more than 300 drugs. There are not enough of the preparations that are used for treating the most widespread diseases: cardiovascular diseases, psychoneurological diseases, oncological diseases, diabetes, asthma.

**TRUD:** And so there is a shortage of virtually all drugs?

**Rakhimova:** The fact is that quite a few modern medications are manufactured by our industry either in small quantities or not at all. Medications like asthma drugs, insulin, hormonal preparations, or enzyme preparations.

**TRUD:** And compared with Western countries...

**Rakhimova:** Let me cite some data, although, of course, any comparison is somewhat arbitrary. Drug production in foreign countries, not counting the CEMA countries, rose over the course of the last 10 years by an average of roughly a factor of 2.5. Our drug production for that same period rose by a factor of 1.9. We use considerably fewer medications than are used in developed countries. But, unfortunately, it's certainly not because we don't get sick as much.

**TRUD:** Just what are the reasons for such a truly unhealthy lag behind the others?

**Rakhimova:** The main reason, I feel, is that for many years we structured our policies in the realm of supplying the country with drugs primarily on acquiring them from the member countries of what was the CEMA. There wasn't enough investment in the domestic medical industry. It's clear that you can't get by without specialization and cooperation in the framework of international division of labor. No one country, not even the largest, most economically powerful country, is capable of supplying itself with every type of product. But at the same time, one mustn't forget about domestic priorities and thereby sacrifice an entire sector. I can't help but mention, too, the closing of many enterprises that is based on ecological considerations. As a result of that, last year our losses in terms of the production of medications came to 1 billion rubles (R). Retooling, rebuilding, and new construction in terms of plants and production facilities are going wretchedly.

**TRUD:** So, now individuals who are ill have nothing to hope for?

**Rakhimova:** The USSR Cabinet of Ministers recently adopted a number of decisions meant to extract us from this crisis situation. This year, 2.4 billion hard-currency rubles have been allocated for the importation of medications. In addition, plans call for the expansion of barter operations, and the transition to clearing accounts for medications with a number of countries is being worked out.

But the main thing is to use our own science, technical, and production potential. Production output has been restarted at chemical and pharmaceutical plants that had been closed down before, but are now safer for the

ecology. But the only way we are going to eliminate the drug shortage is to create a modern pharmaceutical industry. That means we have to have a great deal of scientific research involving drug preparations and a great many enterprises under construction or being rebuilt. We have to be able to almost completely guarantee them a supply of raw materials, goods, and components for domestic production. My position is this: In order to provide people with the types of products and items that are needed by every one of us all the time, every day—be they drugs, or dietary products, or clothing, or shoes—we must rely primarily on our own resources.

The government is preparing a special program whose implementation will enable us in the coming years to take the edge off the drug problem. At the same time, much is already being done now, and that includes by republic-level agencies. For example, the Russian republic this year has invested some R240 million in the chemical and pharmaceutical sector, above and beyond the allocated capital investments.

**TRUD:** The world has not abandoned us in this predicament either...

**Rakhimova:** Humanitarian aid from various countries is, without a doubt, improving the situation. Judge for yourself: just between December and early June of this year, we have received 10,000 tons of drugs, from 30 countries, worth some \$500 million. The medications are being distributed by a central commission specially created by the president of the USSR. In addition, a fairly large quantity of drug preparations is coming in directly to medical institutions as a result of direct ties they have set up, as well as through republic-level state agencies, local Soviets, and social and charitable organizations of our country. Primarily, of course, the drugs are being sent where they're needed the most, that is, to areas, for example, that are suffering from the Chernobyl accident or from earthquakes and to areas in the Aral Sea region. I'd like to take this opportunity to express my sincere gratitude to all the states, governments, firms, and social, charitable, and religious organizations, as well as private individuals, who have given us aid.

Right now, preparations are under way for the signing of an intergovernmental agreement involving humanitarian aid between the United States and the USSR, and thanks to that agreement, shipments to our country will increase considerably.

**TRUD:** And what's the situation with philanthropy inside our country?

**Rakhimova:** The USSR Cabinet of Ministers has gone to the All-Union Communist Party of the USSR with a request that it put out a call to labor collectives at enterprises and organizations that have hard currency to donate some of that currency for the purchase of medications for their own workers and for treatment facilities, primarily those in their own regions. We hope that there is a good response to the request.

[Comments from the Department of Social Problems] As one can see, there's still nothing to rejoice about. Understandably, much depends on the creation of a modern, domestic pharmaceutical industry. But why was it buried in oblivion, and who precisely is the guilty party? And what, are we supposed to wait around for the new factories to spring up and in the meantime try not to get sick? There are some things that can't wait. People are getting sick and dying today. The nation is awaiting energetic measures that can change the situation in the very near future.

### Prosecutor Describes Misappropriations of Imported Medicines

917C0682C Moscow *EKONOMIKA I ZHIZN*  
in *Russina* No 10, Mar 91 p 15

[Interview with Andrey Vladimirovich Churilov, senior prosecutor in the Administration for Oversight of Observance of the Law and of the Rights of Citizens in the Social Sphere, by special correspondent for *EKONOMIKA I ZHIZN* V. Golovachev, under the rubric "Under the Eye of EZh": "In Violation of the Hippocratic Oath"; first two paragraphs are source introduction; last two paragraphs are boxed material]

[Text] It's almost as if the only citizens who can allow themselves to get sick these days are those who are in good health. Otherwise, there's no guarantee of a favorable recovery. And it's not just because the domestic health care sector is in need of treatment itself. It's also because of the catastrophic lack of medical preparations. The leadership in the Ministry of the Medical Industry, which is responsible for the manufacture of drugs, is searching more and more for the causes of the collapse of the sector on the outside and is forgetting about its own sluggishness.

However, hospitals and pharmacies are still being supplied with medicines, even if only in small quantities. But do the medicines always get to the people they are supposed to get to? The prosecutor's office, in the course of one of its 1990 inquiries, set out to find out the extent of illegal use of drugs in health care facilities. The senior prosecutor for the Administration for Oversight of Observance of the Law and of the Rights of Citizens in the Social Sphere, A. Churilov, tells our special correspondent V. Golovachev about the main findings of the inquiry.

**Churilov:** When we began the inquiry, we of course knew that, with today's shortage of drugs, there are quite a few things going on with drugs. And yet, the scale of the abuses turned out to be astonishing. For example, the individuals responsible for materials at pharmacy facilities were missing items worth 10,000-70,000 rubles (R).

The extent of the "work" of many pharmacy chiefs is impressive. Here are some examples to illustrate the point. In the UkSSR, the growth of missing and stolen materials was recorded in one out of every two oblast pharmacy associations of *Farmatsiya*. In M. Babradze's pharmacy No. 29 of the Main Pharmacy Administration



(GAPU) of the Georgian Ministry of Health, we determined that drugs worth R39,500 were missing. K. Uznadze, a department head at the Tbilisi pharmacy No. 27, went considerably "farther" than that—the quantity of his missing items "stretches" to some R80,000. Even more drugs—worth R100,000—disappeared from B. Kovusov, department head at the central warehouse of the GAPU of the Turkmen Ministry of Health.

**EKONOMIKA I ZHIZH:** Andrey Vladimirovich, we get a lot of letters to the editor that ask one and the same question: "A year ago, the country's government allocated R500 million for the purchase abroad of medicines. Just where is that promised "flood" of imported drugs?"

**Churilov:** What's happening with the acquisition of imported medications is simply a mess. As our inquiry has shown, practicing health care workers have known nothing about many of the drugs that have been purchased—and were purchased at quite a high price at that—and for that reason have not used them in the treatments they perform. It's astonishing, but it's a fact, that drugs have been bought, they've been shipped to pharmacies, but the instructions for their use have gotten lost who knows where.

For example, Forluta bought in Italy at a cost of R1 million went to the RSFSR Ministry of Health GAPU facility in December 1989 and was immediately distributed from there to all the regions of the republic. The prescribing information for it didn't leave the All-Union association Soyuzfarmatsiya (whose director is A. Apazov) until March 1990. Still later, in June, local facilities received information on the use of the Turkish preparation Nephramin. That kind of a situation also exists with imported preparations such as Phosphomycin, Virolex, Sporadex, and Thymazol.

**EKONOMIKA I ZHIZH:** According to information from a certain criminal investigation that I've come to be familiar with, it turns out that medical personnel have extorted "compensation" from every third patient questioned. And for the most part, for drugs. Does that mean that without a bribe you don't get treated? In your view, how do we get rid of that depraved practice?

**Churilov:** As long as there's a drug shortage, there'll be abuses. But we can get rid of quite a few of them if we change the system for checking for, and pinpointing responsibility for, illegal distribution of medications. The existing order enables dishonest medical workers to mishandle drugs quite easily. Here's one really blasphemous example. The deputy chief physician of maternity home No. 1 in Bratsk, a man by the name of Kashchenko, prescribed narcotics for childbirth, but in fact used them himself. And a woman coworker from that hospital gave him the injections. A drug addict heading a medical facility—what could be more frightening?

I should note that the number of crimes involving this or that narcotic or strong drug has jumped sharply in recent years. Nine Union republics have recorded a growth in

such crimes. In the Ukraine in particular, the number of crimes associated with narcotics has grown 6-fold since 1987. In 1989, nearly 200 medical workers were shown to have committed such crimes.

**EKONOMIKA I ZHIZH:** After hearing such information, the readers here, I would think, would immediately ask—Where have the medical authorities been while all this is going on?

**Churilov:** We'd like to know the same thing. It's almost as if the director of the All-Union association Soyuzfarmatsiya, A. Apazov, isn't running the system at all. Instead of analyzing the state of affairs at the local facilities, the lion's share of his working time goes to meeting with citizens who were denied drugs in outlying districts. And virtually all the requests—and they amount to more than 10,000 a year—he grants. That means the requests of the citizens are legal. But it follows from that that, in the outlying districts, the distribution of drugs is done arbitrarily. The association is not supposed to be engaged in promoting prosperity, it's supposed to be engaged in bringing order to the entire system. The association is very poorly informed about what things are like in its local facilities. It doesn't even try to generalize the written complaints it gets. And by the way, the number of written complaints has grown 3-fold since 1985.

I should note that A. Apazov has already been penalized by the USSR KNK [not further expanded] for the unsatisfactory operation of the pharmacy system in the Nonchernozem Zone of RSFSR. At the board of the USSR Ministry of Health, I personally demanded that the director of Soyuzfarmatsiya be severely punished. But the leadership of the ministry "felt sorry" for him at the time. In my view, it would have been more humane to feel sorry for the people who were ill.

But even more astonishing was the response of USSR Ministry of Health Deputy Minister A. Moskvichev to the findings of our inquiry. When claims were made to him that he was responsible for the activity of Soyuzfarmatsiya, Aleksey Mikhaylovich gave a long explanation about where and in what law it is written that the deputy minister is responsible for the state of affairs in the outlying districts.

It's a strange situation. The deputy minister does not want to be held responsible for the activity of an association under his authority, the director of the All-Union association does not want to be held responsible for the activity of the republic associations, and the republic associations do not want to be held responsible for the activity of the pharmacies. It's a universal dodge of responsibility, and you can't call it anything else.

The board of the USSR Ministry of Health that was to handle the issue and the presentation of the USSR Prosecutor's Office proceeded sluggishly, in my opinion. There were the same old statements, the same old promises. I categorically protested against taking *du jour* measures like "intensify your efforts," "pay attention to

whatever," and "send whatever." And A. Moskvichev reluctantly, you could say, admitted that there was nothing sparkling about the ministry's decision. But a new decision by the USSR Ministry of Health certainly hasn't been submitted to us yet.

**EKONOMIKA I ZHIZH:** And what were the USSR Prosecutor's Office's suggestion on that score?

**Churilov:** We proposed, in particular, that medical people who allowed abuses in the use of drugs out of profit motives be relieved of duty. In the opinion of the USSR Prosecutor's Office, those guilty of such violations need to have their licenses as medical specialists revoked. Honest physicians and nurses, I'm convinced, wouldn't be scared by that. But dishonest health care specialists and those who have violated the Hippocratic oath are absolutely "contraindicated."

### Medical Industry Minister on Pharmaceuticals Shortages

917C0682D Moscow PRAVITELSTVENNY  
VESTNIK in Russian No 7, Feb 91 p 3

[Comments by V. A. Bykov, USSR minister of the medical industry, as told to correspondent V. Yurteyev, under the rubric "Moscow and the Kremlin": "The Cabinet Is Looking for a Prescription to Eliminate the Drug Shortage"; first two paragraphs are source introduction]

[Text] On 5 February, the operation of the chemical and timber complex of the country was subjected to a critical analysis at a meeting of the USSR Cabinet of Ministers. The situation in those sectors remains extremely complex and unstable. Many of the national economy's and population's needs for chemical and pulp products are not being met. The drug shortage in the country is becoming more and more urgent, and the state is forced every year to spend nearly 2 billion rubles (R) to buy drugs abroad. After a careful and comprehensive discussion of the caustic problems, the government ordered central economic agencies to carefully sort things out in the financial state of the chemical, petroleum-refining, timber, and medical sectors of the industry; make proposals about how to normalize the financial state of those sectors; and to consider constructive proposals associated with improving the management of those sectors as the national economy of our country makes the transition to market relations.

Just why are there fewer and fewer drugs in the pharmacies? Will the domestic medical industry be able to handle a shortage that is extremely painful in the literal and figurative sense of the word? Here is what V. A. Bykov, minister of the USSR medical industry, told our correspondent V. Yurteyev right after the meeting of the Cabinet of Ministers.

**Bykov:** I think Moscow is the only place where you can get any drug you need, but, unfortunately, it wouldn't be in a pharmacy—it would be at the Rizhskiy Market or some other such depraved place. You'll find everything that's produced in our country. So what's the problem?

Well, the problem is in the system for the distribution of the drugs. It's neither the former rigid system of allotment, nor a market. It's out-and-out stealing, with the dealers there getting rich on the basis of an artificial shortage that they've created. Call a spade a spade.

Let's look at the problem of medications in a little more detail. As you know, within the framework of the CEMA that was to have had a long life, there existed a long-term program involving the interaction of cooperation and coordination. And in the context of that program, the Union of Soviet Socialist Republics took upon itself large-tonnage, energy-intensive production, and we delivered to our partners electrical energy, petroleum, metals, and basic chemical products. And the countries of East Europe for their part developed small-tonnage, science-intensive production. In that context, we again painted ourselves into a corner, dooming the country to regular purchases of drugs from our neighbors in Europe. Agreements were long-term, shipment volumes were steadily increasing, and we found ourselves in bondage to our partners in CEMA. The volume of those "medicine" deliveries now amounts to nearly R1.5 billion a year. Just a few months ago, we could hardly manage to get free from an import/export structure so disadvantageous to us.

Our CEMA partners turned out to be much more farsighted. Who among us, tell me, 15 years ago, when the Comprehensive Program of Scientific-Technical Progress of the CEMA Member-Countries was being adopted, could have foreseen the present political and economic arrangement of the countries of East Europe, much less the situation in our own country? As it turns out, in the last decade and a half, we have practically financed the development of the entire pharmaceutical industry in East Europe. But our own medical industry during that time has just barely stayed afloat.

Not only that, but during that time, we, in essence, created nothing for our own pharmaceutical industry. After all, it's a special sector in which everything, from laboratory analyses to the packaging of finished medicinal products, is done with extremely complex production lines. But the level of our equipment is such that if Western firms can produce a finished preparation with four to six production stages, it takes us 15. If we were to be free of just the multiple stages for preprocessing the raw materials itself, the production of drugs in this country on the equipment we have today would immediately grow by 15-20 percent.

For a long time, we didn't study the true needs of the country's people for medications. The social order, which was formed by the Ministry of Health through Gosplan, was never associated with what the health care sector wanted, but with how much money was allotted to the sector in the budget for the next five-year plan. The amount to be spent on drugs was determined on the basis of the amount of that money.

In 1988, they took that brake off, and the request from the Ministry of Health for 1989 immediately jumped by 17 percent; in 1990, the figure jumped another 36.7 percent; and in 1991, yet another 25 percent. And that's why, in spite of the fact that our sector fulfilled the initial program of the five-year plan, and deliveries to all consumers rose by a factor of 1.5, we didn't even approach meeting the country's needs for drugs.

If the average population growth of the country is around 1.5 percent a year, and the deliveries of medications increases every year by 8 percent, then the questions come up—Just where are they disappearing to? My answer is that as long as there's no single state agency coordinating and organizing operations for safeguarding public health in the country, we will always be getting lost in the labyrinths of departmental programs.

State regulation, in my view, should comprise four mandatory functions, one of which is the management of medical science, which must be interdepartmental, and not just involving treatment. There needs to be an all-Union inspectorate for controlling the quality of medicinal preparations and food products, as well as the technologies for producing them—that, by the way, is something we've never had. How many cases of out-and-out deception of the public have there been, when, instead of sea buckthorn oil, evil cooperative people give you a bottle of dyed sunflower oil. Go ahead and let the cooperatives make some medicinal preparations, but under strict government control of their technologies and quality.

The next important question involves the organization of treatment. That organization must be complete, including epidemic-control and other such measures. And finally, there must be a common approach to the establishment of a material-technical base for health care, plus an entire assemblage of issues associated with that.

That is a strategy of development. But what do we have today? The first question that is asked of me, as minister, is—When will the pharmacies have drugs? But let's take a peek for comparison into any Moscow pharmacy and into the food store next door to it. Which of the counters has more on it? The pharmacy's!

One must also take into consideration that medications in the country move in two main directions: to the hospital system and to the pharmacies. For the treatment hospital, the volumes of financing have been increased, and demand for and flow of medications have sharply risen to hospitals, attached medical units, military hospitals, and sanatoria. Pillows and beds in wards have remained the same, and no operating room instruments have been added. Overall growth of number of patients has been achieved by increasing the level of use of medications for treatment, and by decreasing their availability in pharmacies. Funds worth nearly R800 million have been moved to hospitals!

More than once, the USSR Ministry of the Medical Industry has suggested this: Let us be completely responsible for the medications in the country. But today, not I, as the minister, not the ministry apparatus, not the sector as a whole is responsible for all the country's needs. In the existing situation, that is the direct duty of the USSR Ministry of Health. And that is one more serious management mistake. Why?

The USSR Ministry of Health has its own huge association, Soyuzfarmatsiya, which has its own heavy cross to bear, one it inherited from the former Main Pharmacy Administration of the same ministry. The USSR Ministry of the Medical Industry is only one of 18 large producers of medications in the country and is one of many suppliers, including of foreign-bought medications, to that organization. But there are, after all, 17 other producers of drugs, among which are all the republic-level agroproms [agricultural industries]. And it's there that production in the past five-year plan dropped considerably.

Here's a fact: Many, many arrows have been shot into the Ministry of the Medical Industry because of the absence in the pharmacies of mustard plasters! What is minister V. Bykov doing? But there's nothing I can do—not a single enterprise of the ministry has ever produced, or will ever produce, mustard plasters. The mustard plasters in the country are produced by a single, solitary plant of the Volgograd agroprom, which we never belonged to.

Need another example? Condoms and disposable medical gloves—they're part of the nomenclature of products of the USSR Ministry of the Petroleum Refining Industry. Medical equipment—that's the business of the machine-building ministries, particularly the USSR Ministry of General Machine Building. Scalpels, scissors, clamps, chairs—we don't have enough of them, and people again blame the USSR Ministry of the Medical Industry. Does it have to be responsible for others' sins?

The USSR Ministry of Health itself lowered production of medications. It has nearly 100 pharmaceutical factories and 30,000 pharmacies. At the outside, for the 450,000 individuals that are working in Soyuzfarmatsiya and that are involved in manufacturing and distribution of medications, there are about half as many workers in the medical industry. There about 250,000 of the latter in this country. And each of them must, on average, provide drugs for nearly 1,000 of the country's inhabitants!

Just what is the new strategy of the USSR Ministry of the Medical Industry? The Ministry of Health, in establishing the social order, must make suggestions to the USSR Supreme Soviet on major issues. What drugs will we make in this country? Which will we buy abroad? How, with those two flows of drugs, will we furnish them to our population?

The Ministry of the Medical Industry is ready to assume those functions. Why?

Because it can remove so much faster the stress in the public consciousness in which this "fact" is nesting itself as a dangerous splinter—the USSR buys half its medications abroad. But in fact, the situation looks like this. The percentage of imported drugs for the country as a whole is about 44 percent. That's in rubles and copecks. But if you look at the picture in actual measurement, in ampules and tablets, we buy a total of 11 percent of our drugs with hard currency. What does that tell you?

Almost half of the money from the state budget goes for the purchase of only one-tenth of the nomenclature of drugs, and the other half is for the remaining 90 percent, which are drugs that are no less needed. But the first, "imported half" turns out to be much heavier than the second, domestic half. Each tablet coming to us from abroad costs 5 to 7 times more than that which we produce ourselves. For that reason, when they cry about the unwieldy importation of drugs, it's justified only for the monetary aspect—in "actual measurement," the country uses domestic preparations in nine-tenths of its treatments.

The Ministry of Health is not capable of changing that ratio. The Ministry of the Medical Industry is tackling that. How?

The medical industry is prepared to cooperate, such that it can get abroad not finished forms, but substances, and then make the drugs itself. Then part of the hard currency saved would go not to the purchase of blue wash basins and toilet bowls, but for the purchase of modern equipment to expand the production of drugs inside the country. A decision to include the Soyuzfarmatsiya in the medical industry would make it possible to have in this country a unified complex that would ensure a standardized material-technical base for health care. Who's against that? Those who for the moment cannot directly regulate the flows of foreign and domestic drugs or distribute them according to the "rules of the game" of their own departments.

The growth of our sector has some big problems. We cannot begin the construction of 22 of 40 plants, which is called for by the Union program Zdorovye [Health]. In some places, the soviets will not provide the land; in others, they demand allocations that don't bear up to any kind of economics or common sense. It's cheaper not to build! Third, they are trying to close down operating enterprises. We now have about 100 such "hot spots."

All the republics want to receive drugs without producing them. Especially Russia, although it is there that, in light of the size of its territory, the Ministry of the Medical Industry proposes the primary growth in capacities for the manufacture of drugs. Certain republics have agreed to begin construction, but out of the Ministry of the Medical Industry budget, as if they forgot that the ministry has long since not had any money for investing.

The ministry will continue the state line in the pharmaceutical industry—any other route would be fatal for the country. It might possibly be much simpler for us to engage in production only and not be responsible for all the growing needs for medicine. In market conditions, almost every one of our plants would be a monopoly and would be living in clover. But we can't allow ourselves such a luxury. The committees and commissions of the USSR Supreme Soviet support us in that: The system of state control of the pharmaceutical industry must be preserved.

We proposed to the Cabinet of Ministers two versions that would be acceptable in the present situation. Either combine the production facilities by production principle into concerns and associations, and then we would need a State Committee for Chemicalization and Biotechnologization, as a generator of national programs for those areas. Or set up a State Committee for Safeguarding Public Health, in which we would perform the function of a head buyer, with all the tax exemptions. We must choose the one true prescription, because it involves, after all, the health of the people.

### Investigation of Parameters of Physical Fitness of Rodents by Means of Multiple Speed Swimming Following Uniform and Uneven Exposure to High Radiation Doses

917C0511A Moscow *RADIOBIOLOGIYA* in Russian  
Vol 31 No 1, Jan-Feb 91 (manuscript received  
19 Feb 90) pp 114-119

[Article by V. N. Malakhovskiy, P. P. Mikhaylichenko, and P. V. Tikhomirov, Military Medicine Scientific Research Institute, Moscow Oblast, USSR, Leningrad]

UDC 577.391.599.323.4

[Abstract] Impairments in the ability to perform brief exercise and the rate of fatigue onset in albino male mice (18-22 g) and albino male rats (190-220 g) were investigated following total and partial exposure of the animals to doses of gamma radiation ranging from 10 to 200 Gy (1.7 Gy/min). The animals had been trained to complete 20 laps of 1.4 m (mice) or 1.6 m (rats). The results demonstrated that the rate of fatigue onset is one of the most informative indicators. It was also shown that the "start" time for swimming changed only slightly, indicating that endurance is impaired more than strength. It is believed that this is due to a decrease in macroerg synthesis in the brain and is one of the mechanisms of total and central fatigue. In addition, the data revealed that a 70-100 Gy dose is the threshold of an abrupt increase in the fatigue onset rate in both rats and mice and that damage at this point is irreversible. In other experiments in which body parts were shielded from radiation by a lead apron, it was shown that decreasing the dose to the head and anterior half of the body resulted in an abrupt decrease in the rate of fatigue onset, while shielding the posterior half of the body had virtually no effect. Findings of this investigation also confirmed that exposure of the head and central nervous system to high doses of radiation plays a substantial role in diminishing physical endurance. Figures 3; tables 1; references 12: 10 Russian, 2 Western.

### Thyroid Hormone Involvement in Modification of Mutagenic Effect of Microwaves

917C0511C Moscow *RADIOBIOLOGIYA* in Russian  
Vol 31 No 1, Jan-Feb 91 (manuscript received  
14 May 90) pp 147-149

[Article by I. V. Koveshnikova and Ye. N. Antipenko, Ukrainian Scientific Hygiene Center, Ukrainian SSR Ministry of Health, Kiev]

UDC 577.391.612.018

[Abstract] The role of the thyroid hormones in regulating chromosome integrity under conditions of microwave radiation exposure (continuous - 2,450 MHz or pulsed - 2,750 MHz, 500  $\mu$ W/cm<sup>2</sup>, 7 h per day, 30 days) was evaluated in three-month-old albino rats. The results demonstrated that a change in the thyroid hormone

levels modified the mutagenic effect of the microwave exposure. It was shown that the T<sub>4</sub> level in thymectomized animals was 1.6-fold lower than normal and that the mutagenic effect of the microwaves was 1.4-fold greater. Moreover, T<sub>4</sub> injections amplified the mutagenic effect of exposure by 1.3-fold. In summary, normal thyroid function limits the effect of microwave radiation exposure. Accordingly, individuals with thyroid dysfunction are at risk and should not work near non-ionizing radiation sources. Figures 1; references 10: 9 Russian, 1 Western.

### Novel Radiation Technique of *in Vivo* Determination of Stable Iodine Level in Thyroid

917C0512A Moscow *MEDITSINSKAYA RADIOLOGIYA* in Russian Vol 36 No 3, Mar 91  
(manuscript received 22 Feb 90) pp 19-22

[Article by I. O. Tomashevskiy and D. I. Tomashevskiy, Clinical Hospital No. 119, Moscow]

UDC 616.441-008.921.5-073.75

[Abstract] A technique intended to significantly improve the diagnosis of thyroid pathology has been developed in the novel field of radiofluorescent assay, which tests for stable iodine in the thyroid by means of an externally located detector. This device records the typical x-ray radiation of the element excited by the external radiation source. The test is performed without the use of radionuclide injection. Clinical trials of radiofluorescent assay for stable iodine were performed on 20 women aged 36 to 55 years who did not have any clinical signs or past history of thyroid disorder. The radiofluorescent assay transmitter is placed such that it is in direct contact with the skin covering the thyroid and the stable iodine levels are recorded within 10-20 seconds. The total iodine level is calculated by multiplying the concentration in the thyroid by the thyroid mass. The entire procedure takes approximately 20-35 minutes. It was shown that there is a 90 percent reproducibility of results and the range of error for a single measurement is between 5 and 30 percent. The local radiation dose of 2 mZr using this technique is 50-fold less than that of <sup>131</sup>I that currently is used in thyroid injections, so this procedure is quite safe even for the regular examinations of children, pregnant and nursing women, and individuals in radiation-contaminated areas. The results of this investigation demonstrated that the concentration of stable iodine in the thyroid of healthy individuals is 500  $\mu$ g/g; the total content throughout the organ is 10.3 mg. The thyroid mass averages 20.2 g. Tables 1; references 8: 6 Russian, 2 Western.

### Treatment of Victims of Accident at Chernobyl and Indirect Outcomes of Disease

917C0512B Moscow *MEDITSINSKAYA RADIOLOGIYA* in Russian Vol 36 No 3, Mar 91  
(manuscript received 19 Apr 90) pp 29-32

[Article by A. Ye. Baranov, A. K. Guskova, and T. G. Protasova, Biophysics Institute, USSR Ministry of Health, Moscow]



UDC 616-001.28-02:614.876]-08-036.8-07

[Abstract] This report discusses what information on the victims of penetrating radiation exposure has contributed to the current knowledge of acute radiation sickness. The basic tenets of treatment of patients following the accident at Chernobyl included—1. grouping patients according to the nature, severity, and probable outcome of the disease, depending on the amount of the dose, which helped to determine the optimal regimen of therapy; 2. thorough investigation of the specific manifestations of acute radiation syndromes and their complications; and 3. individualization of therapy according to the prognosis and symptoms based on the specific aspects of the clinical pattern. Biseptol 480 and nystatin were administered in doses of 5,000,000 U per day and appeared to be effective in treating endogenous infections. Systemic antibiotics were also prescribed to reduce fevers. The innovative use of fresh donor thrombocytes is one of the indisputable advances in treating bone marrow syndrome. In instances where the gamma radiation dose, as assessed by the peripheral blood lymphocyte count and the number of chromosomal aberrations, exceeded 6 Gy, allogenic bone marrow cells and human fetal hepatocytes were transplanted. However, the results indicate that bone marrow transplants are not very effective in disasters such as this. Plasmapheresis was shown to be quite effective in cases of severe  $\beta$ -radiation burns covering 30-40 percent of the body. Infusion of 1,000 ml of fresh frozen plasma and the use of heparin in cases of hepatorenal syndrome encephalopathy due to disseminated intravascular coagulation seemed to prolong the life of the victims. Also discussed in this report were the organization principles of providing treatment for a large number of patients with acute radiation syndrome. References 3: 2 Russian, 1 Western.

#### Ultrasound Scanning of Thyroid in Children From Bryansk Oblast in 1989

917C0512C Moscow MEDITSINSKAYA  
RADIOLOGIYA in Russian Vol 36 No 3, Mar 91  
(manuscript received 27 Apr 90) pp 32-35

[Article by G. A. Zubovskiy and O. B. Tararukhina, MNIRRI [as published], RSFSR Ministry of Health]

UDC 616.441-053.5-073.432.19

[Abstract] As a result of the accident at Chernobyl, large numbers of children were exposed to radiation (30-260 rads). In order to screen for pathological changes in the thyroid promptly and render the necessary treatment, an ultrasensitive transducer was developed with frequencies of 7.5 and 10 MHz for examining the thyroid. The advantages of this transmitter are that it is able to completely depict areas of the thyroid, including transverse and longitudinal scanning, to determine the extent

of hyperplasia and to provide excellent resolution of the transducer, which identifies echogenic neoplasms (cysts and follicles) and nodes 3-5 mm in size. Mass screenings were performed on 12,000 children, with detailed examinations conducted for three groups of children. The results demonstrated that 4 percent of the children in Moscow, the control group for comparison with Bryansk Oblast, had changes in the thyroid, compared with a 10 percent incidence for both Novozybkov and Karachev, a 2- to 2.5-fold greater rate. It was also shown that throughout the Bryansk Oblast, an area of iodine endemia, the incidence of structural alterations to the thyroid among the children is the same (10 percent), regardless of whether the area is radiation-contaminated. However, the incidence of hypoplasias and thyroiditides was considerably higher in the radioactive areas (Novozybkov) than in the non-radioactive, iodine endemia (Karachev) areas. The thyroids were also substantially larger in children living in Novozybkov, even four years after the accident. The device is recommended for the mass screening of children in radiation-contaminated areas. Figures 2; tables 3; references 8: 2 Russian, 6 Western.

#### Radiation Exposure of Personnel at Industrial and Atomic Energy Reactors

917C0512D Moscow MEDITSINSKAYA  
RADIOLOGIYA in Russian Vol 36 No 3, Mar 91  
(manuscript received 27 Jul 90) pp 38-43

[Article by L. A. Buldakov, A. M. Vorobyev, V. V. Kopayev, N. A. Koshurnikova, A. F. Lyznov, A. V. Simakov, and V. M. Chistokhin, Biophysics Institute, USSR Ministry of Health, Moscow]

UDC 613.648.4-074

[Abstract] This article reviews the safety standards of uranium graphite reactors from when they were first used in 1947 and various types of nuclear electric power plants. In the first few years of operation, the health of the work force was disregarded in order to produce as much plutonium as possible. For example, in 1949, when the reactors were operating at full power, over 99 percent of the employees were exposed to radiation doses exceeding the maximum permissible dose. Naturally, these individuals often developed acute or chronic radiation sickness. As construction improved the exposure of personnel diminished, despite a rise in industrial output, and within nine years of the time when the reactors were first used, the average annual dose had been decreased to 5 sZv. In addition, organizational measures of radiation protection and safety also reduced the radiation exposure of personnel such that today the annual exposure dose averages 0.2-0.8 sZv. Figures 2; tables 6; references 8: Russian.



### Inhibition of pH-Dependent Fusion of Equine Encephalitis Virus With Artificial Membranes Using Non-Neutralizing Monoclonal Antibodies

917C0399A Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 316 No 1, Jan-Feb 91 (manuscript received 25 Jun 90) pp 231-234

[Article by M. F. Vorovich, A. V. Timofeyev, S. N. Atanadze, Sh. M. Tugizov, I. G. Sidorovich, V. V. Khozinskiy, A. A. Kushch, and L. B. Elbert, Institute of Poliomyelitis and Viral Encephalitis, USSR Academy of Medical Sciences; Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences; Institute of Immunology, Moscow]

UDC 576.809

[Abstract] The pH dependent fusion of tritiated equine encephalitis virus with synthetic membrane liposomes composed of phosphatidylethanolmaine, phosphatidylcholine, sphingomyelin and cholesterol was studied at various pH values after a 3 minute incubation at 37. Fusion of virus particles to liposomes containing RNAase was seen at pHs below 7, with a sharp rise at pH 6.4. This correlates with the conformational change observed in the E protein at pH 6.4. Preliminary incubation of the virus with polyclonal or G11 monoclonal antibodies, but not S 1-3 monoclonal antibody, prevented fusion. This indicates that the A(RI) domain of the E protein is involved in fusion. The results obtained serve as further evidence for the existence of alternative pathways for equine encephalitis virus to penetrate the cell. Figures 1; references 14: 1 Russian, 13 Western.

### Antigenic Properties of Nucleocapsule Protein Peptide Fragments in Delta Hepatitis Virus

917C0399B Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 316 No 1, Jan-Feb 91 (manuscript received 17 Jul 90) pp 239-242

[Article by R. P. Yevstigneyeva, associate member, USSR Academy of Sciences, V. D. Smirnov, Yu. A. Semiletov, V. A. Karpova, Yu. Ye. Khudyakov, S. O. Vyazov, R. P. Pablyuchenkova, T. M. Ospelnikova, Ye. I. Prokuronova, and G. A. Zheltukhina, Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences; Moscow Institute of Fine Chemical Technology imeni M. V. Lomonosov]

UDC 547.964.577.1

[Abstract] The distribution of immunodominant sectors in the virus specific antigenic determinant of hepatitis delta virus was subjected to theoretical analysis. The antigenic properties of a series of peptide fragments derived from the B-epitope were also investigated. Structural analysis demonstrated that the protein is highly hydrophilic and contains numerous  $\beta$ -helical segments, particularly near the C-terminus. Attention was focused on the 169-179 fragment, which was found to be highly acrophilic and to have  $\beta$ -helices at the 169-172 and

175-177 positions. This peptide fragment, and an analogous peptide in which methionine was replaced by norvaline, were synthesized and tested for ability to react with anti-hepatitis delta antibodies derived from patients. Both the peptides gave positive results in the unconjugated state, while other peptides synthesized to correspond to other portions of the protein did not. After conjugation with bovine serum albumin weak responses were seen with the 169-179 fragment and its norvaline homologue, as well as peptides representing positions 40-49, 153-167, and 201-211 of the antigen. Despite possible differences in conformation between the peptides used and the native protein, and despite problems of heterogeneity, the results indicate that the 169-179 region of the specific antigenic determinant of hepatitis delta is part of the immunodominant region of this antigen. Figures 2; references 15: 4 Russian, 11 Western.

### Solubilizing Properties of Protein Conjugates With Water-Soluble Polyesters

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[Article by I. N. Topchiyeva, I. G. Momot, B. I. Kurganov, and N. A. Chebotareva, Moscow State University imeni M. V. Lomonosov; Institute of Biochemistry imeni A. N. Bakh, USSR Academy of Sciences, Moscow]

UDC 577.15.02+541.182

[Abstract] The solubilization of 2',3',4',5'-tetrabenzoyl-5-acetyl-1,5-dihydoriboflavin (benzaflavin) by conjugates of bovine serum albumin (BSA) with block copolymers was studied using the sedimentation rate method in an ultracentrifuge. BSA was found to have significant solubilizing activity relative to benzaflavin, while proxanol did not. BSA-proxanol conjugates raised the solubilization limit, particularly those with hydrophobic groups on the periphery. Increasing the number of polymeric chains in the conjugate protein lowered the solubilization limit, due to a screening effect. Introduction of the benzaflavin in an alcoholic solution gave more solubilization than suspension of the dry material in an aqueous solution of solubilizing agent. The limit of solubilization was greatest at pHs of 7.6-9.0. Increasing buffer concentration decreased solubilization by both protein and conjugate. The data suggest that the benzaflavin is localized in the hydrophobic portions of the BSA protein. When using chlorophyll or tetrabromotetraiodofluorescence as ligand, only limited solubilization was seen. The results obtained demonstrate a new approach to creating highly effective solubilizing agents. Figures 4; references 6: 4 Russian, 2 Western.

### Effects of Laser Light Intensity on Gastric Ulcer Healing

917C0564A Moscow SOVETSKAYA MEDITSINA in Russian No 2, Feb 91 (manuscript received 22 Jan 90) pp 9-11

[Article by A. S. Loginov, G. N. Sokolova, I. A. Smotrova (dec), V. B. Potapova, Ye. P. Markin and R. V.

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UDC 616.33-002.44-085.849.19/-003.9-07

[Abstract] Clinical trials were conducted with copper laser (510 nm) therapy of refractory gastric ulcers using low (0.1-0.3 W; 70 patients) and high (0.5-1.5 W; 40 patients) power output. Exposure time was adjusted to give a dose of 10-12 J per treatment. The 110 patients were 17 to 75 years old with a 2 to 10 year gastric ulcer history with at least a three month period of exacerbation. The results showed that the incidence of healing with endoscopic laser therapy was virtually identical in the two groups, 91.9 percent for the low dose patients and 89.7 percent for the high dose patients. However, the time required for healing was on the average 5.3 weeks in the former group after six sessions and 3.4 weeks ( $p < 0.001$ ) in the latter group after four treatments. Histopathologic and electron microscopic observations demonstrated that the efficacy of laser therapy was related to stimulation of inflammation and more rapid rearrangement of connective tissue stroma conducive to wound healing. Tables 1; references 14: 11 Russian, 3 Western.

#### **Laser Therapy in Chronic Obstructive Pulmonary Diseases (COPD)**

917C0564B Moscow SOVETSKAYA MEDITSINA  
in Russian No 2, Feb 91 (manuscript received  
30 Mar 90) pp 32-36

[Article by Ye. V. Demicheva, Chair of Propaedeutics of Internal Diseases, 2nd Therapeutic Faculty, Moscow Medical Academy imeni I. M. Sechenov]

UDC 616.24-007.271-036.2-085.849.19(048.8)

[Abstract] A review of largely Soviet literature is presented on the application of laser therapy in COPD, emphasizing that variability in outcome is largely predicated on the different etiologic factors that may be involved, their interactions, and pathogenetic mechanisms. The recent decade has been marked by a rise in the use of helium-neon lasers both for blood irradiation and/or for stimulation of acupuncture points. The approaches have been empirical, but the indications are that, on balance, clinical benefit can be obtained and are reflected in improved performance on pulmonary function tests. The clinical spectrum includes improved oxygen saturation of the blood, enhanced vascularization, and more efficient hemodynamics indicative of enhanced efficiency of the cardiorespiratory system. References 62: 54 Russian, 8 Western.

#### **Mental Status of HIV Infected Individuals During Social and Psychological Adjustment**

917C0564C Moscow SOVETSKAYA MEDITSINA  
in Russian No 2, Feb 91 (manuscript received  
6 Mar 90) pp 80-82

[Article by V. V. Belyayeva and Ye. V. Ruchkina, Specialized Scientific Research Laboratory for AIDS Epidemiology and Prevention, Central Scientific Research Institute of Epidemiology, USSR Ministry of Health, Moscow]

UDC 616-092:612.017.1.064]-022.7:578.828.6]-  
022.1-092:612.821.3.014.49

[Abstract] Psychiatric evaluations were performed on 90 HIV infected individuals and six with AIDS to assess their mental status in the initial stages of the infection or disease. The cohort consisted of men (67.7 percent) and women (32.3 percent) with respective age means of 29.5 and 30.1 years. In the early stages of social and psychological adjustment 69.5 percent of the patients displayed depression, anxiety and restlessness, while 20.7 percent exhibited frank fear and despondency. In addition, 17.3 percent of the patients evidenced passive contemplation of suicide. The patients showed a predisposition to alcoholism as a method of coping with what is perceived as a hopeless situation. Consequently, the study demonstrated that in the immediate post-diagnosis period changes in mental outlook are best described as reflecting psychogenic reactions. In the absence of symptomatology attitudes are predicated on the level of social and psychological acceptance and adjustment. References 5: 3 Russian, 2 Western.

#### **HIV Antigens Produced by Recombinant Vaccinia Virus: Properties and Use in Confirmatory Tests**

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in Russian Vol 34 No 5, Sep 90 (manuscript received  
15 Aug 89) pp 479-483

[Article by M. I. Bukrinskiy, A. N. Vzorov and A. B. Bukrinskaya, Chair of Virology, Central Institute for Advanced Training of Physicians, USSR Ministry of Health, Moscow, USSR]

[Abstract] Recombinant vC<sub>3</sub> and vE234L strains of vaccinia virus were employed for the production of HIV antigens rp50, rgp160 and rgp160/rgp120. The latter were then used in immunoblotting and indirect immunofluorescent tests of sera obtained from cases of HIV infection. Studies with 100 sera, a panel that included 30 false positive sera reacting with proteins encoded by 'gag' and 'env' HIV genes in commercial test kits, did not give false positive reactions with the recombinant HIV proteins. Accordingly, these findings demonstrated that the recombinant proteins obtained in heterologous systems are suitable for confirmatory immunoblotting tests. Figures 4; tables 1; references 8: Western.

### 5'-Variable Genome Sequence of Vaccinia Virus LVP. Possible Role of Short Direct Repeats in Formation of DNA Deletions

917C0435 Moscow GENETIKA in Russian Vol 27  
No 1, Jan 91 pp 13-26

[Article by G. G. Prikhodko and I. V. Babkin; All-Union Scientific Research Institute of Molecular Biology; NPO "Vektor"; Koltsovo; Novosibirsk]

UDC 577.113.5:578.821.51

[Abstract] Results of a comparative analysis of HindIII-O/N- and HindIII-N/M-DNA fragments of vaccinia virus of strains LVP and WR showed that interstrain differences of nucleotide sequences of HindIII-O- and HindIII-N DNA fragments were 72 percent and 2.88 percent with consideration of deletions. Differences of primary structures of the polypeptides were 0.87 percent and 1.95 percent, respectively. Computer analysis revealed "reliable" direct repeats which may participate in formation of DNA deletions. It was assumed that vaccinia virus endonucleases and DNA-ligase participate in the reparation and replication process and the number of inter-strain differences is determined by the remoteness from the spot of initiation of replication. Mechanisms of formation of variable sequences of viral genomes were discussed. Figures 5; references 25: 11 Russian, 14 Western.

### NMR T<sub>1</sub> Relaxation Time of Plasma in Burn Cases

917C0542A Moscow LABORATORNOYE DELO  
in Russian No 3, Mar 91 (manuscript received  
13 Jun 90) pp 13-16

[Article by G. I. Kozinets, O. V. Popova, S. V. Ignatov and M. G. Gangardt, All-Union Hematological Scientific Center, USSR Ministry of Health Moscow]

UDC 617.-001.17-095.246.2-036.8-073.916

[Abstract] Trials were conducted on 18 patients with burns to assess the utility of NMR T<sub>1</sub> relaxation times as indicators of patient status. Readings on plasma samples (45°C; 34.5 MHz, 90°-τ-90°-180° pulse sequence) revealed mean control values of T<sub>1</sub> = 1.735 sec for donor plasma. The pre- and immediate postplasmapheresis values for patients with burns were 1.916 and 2.253 sec, respectively, and 2.249 sec one day after plasmapheresis. Delayed plasmasorption had no telling effect on T<sub>1</sub>. However, delayed reinfusion of autologous plasma resulted in an increase in T<sub>1</sub> to 2.114 sec. The beneficial clinical effects of plasmapheresis and plasma reinfusion were found to correlate with an increase in T<sub>1</sub> values, showing that the latter reflects clinical status and may be used in patient monitoring. Figures 1; tables 3; references 3: Western.

### Antioxidant Index of Biological Materials

917C0542B Moscow LABORATORNOYE DELO  
in Russian No 3, Mar 91 (manuscript received  
1 Jun 90) pp 19-22

[Article by V. B. Martynyuk, S. N. Kovalchuk, M. F. Tymochko and Ye. N. Panasyuk, Lvov Medical Institute]

UDC 616-008.939.15-39-074

[Abstract] A simple method was designed to assess endogenous and drug-affected lipid peroxidation and antioxidant systems in biological tissues. The essence of the method consists of comparative analysis of malonic dialdehyde (MD) accumulation in paired tissue samples differing in sample concentration since the relationship between the two processes are not simply additive. In addition to serving as a lipid substrate, the tissue also provided antioxidants, the activity of which was also reflected drug-treatment and/or antioxidants added to samples. Studies with rat and rabbit sera (0.1 & 0.2 ml), rat myocardial, hepatic and intestinal mucosal homogenates (8.3 & 25 mg tissue), and rat hepatic and myocardial mitochondria (0.9 & 1.8 mg protein) showed that the resultant ratios of MD accumulation do indeed reflected tissue antioxidant status. Studies on the sera of six patients with chronic circulatory insufficiency showed significant depression of antioxidant activity (1.12 rel. U) in comparison with control sera (1.42 rel. U). The latter suggests that preoperative antioxidant therapy is indicated in this category of patients. An authors' certificate has been awarded for this simple technique for assessing tissue antioxidant activity. Tables 5; references 11: 7 Russian, 4 Western.

### Differential Medium for Yersinia Isolation

917C0542C Moscow LABORATORNOYE DELO  
in Russian No 3, Mar 91 (manuscript received  
25 May 90) pp 77-78

[Article by V. I. Kuznetsov, Bacteriologic Laboratory, Sanitary Epidemiologic Station, Irkutsk]

UDC 579.842.23-083.12

[Abstract] A diagnostic agar medium has been designed for the differential isolation and identification of Yersinia, offering considerable advantages in terms of detection and cost. The composition is as follows per 1000 ml of water: 27-35 g agar, 25 ml bile, 7 g mannitol, 1.6 g anhydrous sodium carbonate, 3.68 g disodium phosphate, 5 g yeast extract, 0.6 g ammonium molybdate, 3.6 ml of 0.1 percent crystal violet solution, 5 ml of 0.5 percent Rivanol, 7 ml of 1 percent bromthymol blue, pH adjusted to 7.4-7.6. After 48-72 h of incubation at 25-37°C the Yersinia formed 4-5 mm yellow to yellow-brown or yellow-brown colonies. Inoculation with swabs from 635 objects yielded 105 Yersinia colonies (Y. pseudotuberculosis, Y. enterocolitica, Y. frederiksenii, Y. kristensenii) on this medium, as opposed to 97 colonies on bismuth sulfite agar, 21 on Serov agar, and 3 on Endo agar. References 2: Russian.

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